IRRIGATION

ADMINISTRATION REPORT

OF THE

UNITED PROVINCES

FOR THE

YEAR ENDING MARCH 31, 1940

ALLAHABAD:
SUPERINTENDENT, PRINTING AND STATIONERY, UNITED PROVINCES, INDIA
1941

[Price Rs.2-0-0.]

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UNITED PROVINCES

Statement showing by fasls areas irrigated by all canals in the United Provinces from 1853–54 to 1939–40

Year	Total area irrigated: *Kharif*	Total area irrigated: *Rabi*	Total area irrigated: Total	Remarks
	Acres	Acres	Acres	
1853-54 ..	55,976	79,412	135,388	
1854-55 ..	40,000	24,159	64,159	
1855-56 ..	49,199	127,712	176,911	
1856-57 ..	41,449	33,264	74,713	
1857-58 ..	20,777	33,127	53,904	
1858-59 ..	67,826	87,020	154,846	
1859-60 ..	124,061	233,298	357,359	
1860-61 ..	234,043	469,939	703,982	
1861-62 ..	193,657	506,407	700,064	
1862-63 ..	135,283	337,874	473,157	
1863-64 ..	232,596	491,553	724,149	
1864-65 ..	333,098	575,747	908,845	
1865-66 ..	294,996	505,523	800,519	
1866-67 ..	321,475	661,913	983,388	
1867-68 ..	289,911	471,568	761,479	
1868-69 ..	484,485	957,413	1,441,898	
1869-70 ..	501,625	588,048	1,089,673	
1870-71 ..	396,399	654,409	1,050,808	
1871-72 ..	333,120	519,374	852,494	
1872-73 ..	353,621	586,965	940,586	
1873-74 ..	401,622	647,712	1,049,334	
1874-75 ..	389,707	752,745	1,142,452	
1875-76 ..	429,957	758,406	1,188,363	
1876-77 ..	463,430	776,353	1,239,783	
1877-78 ..	731,585	729,844	1,461,429	
1878-79 ..	660,026	1,076,625	1,736,651	
1879-80 ..	557,486	842,919	1,400,405	
1880-81 ..	700,587	1,032,109	1,732,696	
1881-82 ..	706,025	1,209,924	1,915,949	
1882-83 ..	740,390	1,233,785	1,974,175	
1883-84 ..	825,757	1,471,927	2,297,684	
1884-85 ..	773,603	843,701	1,617,304	
1885-86 ..	702,259	1,007,417	1,709,676	
1886-87 ..	541,821	821,994	1,363,815	
1887-88 ..	612,436	904,852	1,517,288	
1888-89 ..	653,443	951,310	1,604,753	
1889-90 ..	649,737	1,229,666	1,879,403	
1890-91 ..	727,489	1,286,625	2,014,114	
1891-92 ..	766,215	1,278,815	2,045,030	
1892-93 ..	706,221	1,093,625	1,799,846	

Year	Total area irrigated: *Kharif*	Total area irrigated: *Rabi*	Total area irrigated: Total	Remarks
	Acres	Acres	Acres	
1893-94 ..	744,381	900,816	1,645,197	
1894-95 ..	777,913	151,548	929,461	
1895-96 ..	716,756	1,293,265	2,010,021	
1896-97 ..	1,200,460	1,823,424	3,023,884	
1897-98 ..	992,583	1,518,590	2,511,173	
1898-99 ..	789,941	1,463,861	2,253,802	Fatehpur branch opened for irrigation on December 1, 1898.
1899-1900	1,071,433	1,758,361	2,829,794	
1900-01 ..	920,386	1,080,540	2,000,926	
1901-02 ..	915,482	1,700,623	2,616,105	
1902-03 ..	844,259	1,597,952	2,442,211	
1903-04 ..	897,473	1,751,677	2,649,150	
1904-05 ..	934,263	1,169,915	2,104,178	Mat branch, Ganges canal, completed.
1905-06 ..	1,393,641	2,129,798	3,523,439	
1906-07 ..	1,083,479	1,504,978	2,588,457	Ken canal opened for irrigation on July 16, 1907.
1907-08 ..	1,486,369	1,985,648	3,472,017	
1908-09 ..	1,076,943	1,707,257	2,784,200	
1909-10 ..	944,049	1,568,816	2,512,865	
1910-11 ..	979,984	1,289,227	2,269,211	Dhukwan weir, Betwa canal, completed during the year. Dhasan canal opened for irrigation on December 19, 1910.
1911-12 ..	1,298,010	1,143,741	2,441,751	Hathras branch, Ganges canal, opened for irrigation on December 16, 1911.
1912-13 ..	1,153,574	1,544,698	2,698,272	
1913-14 ..	1,479,190	1,970,713	3,449,903	
1914-15 ..	1,445,752	1,821,520	3,267,272	Sukhra canal opened for irrigation from *kharif* 1914 and Majhgawan tank with effect from *rabi* 1914-15.
1915-16 ..	1,236,409	2,007,577	3,243,986	Garai canal opened for irrigation with effect from *kharif* 1915 and Ghori canal with effect from *rabi* 1915-16.
1916-17 ..	1,111,604	1,800,487	2,912,091	Ghagar canal opened for irrigation with effect from *rabi* 1916-17.
1917-18 ..	1,304,196	1,905,229	3,209,425	
1918-19 ..	1,632,170	2,062,693	3,694,863	
1919-20 ..	1,523,886	1,949,961	3,473,846	
1920-21 ..	1,434,191	1,962,333	3,396,524	
1921-22 ..	1,020,455	1,668,119	2,688,574	
1922-23 ..	1,062,786	1,600,792	2,663,578	
1923-24 ..	1,087,771	902,333	1,990,104	
1924-25 ..	1,020,598	1,264,945	2,285,543	
1925-26 ..	1,043,981	1,760,797	2,804,778	
1926-27 ..	1,210,871	1,778,645	2,989,516	
1927-28 ..	1,181,790	1,155,461	2,337,251	
1928-29 ..	1,598,088	2,524,477	4,122,565	Sarda canal opened for irrigation in September, 1928.
1929-30 ..	1,838,798	2,778,079	4,616,877	
1930-31 ..	1,812,830	2,189,424	4,002,254	
1931-32 ..	1,545,463	1,954,480	3,499,943	
1932-33 ..	1,550,538	2,411,059	3,961,597	
1933-34 ..	1,690,209	2,116,875	3,807,084	

UNITED PROVINCES

Statement showing by fasls areas irrigated by all canals in the United Provinces from 1853-54 to 1939-40—(concluded)

Year	Total area irrigated			Remarks
	Kharif	*Rabi*	Total	
	Acres	Acres	Acres	
1934-35 ..	1,240,944	2,612,622	3,853,566	
1935-36 ..	1,749,053	2,603,110	4,352,163	
1936-37 ..	1,756,764	2,093,780	3,850,544	
1937-38 ..	1,911,694	3,276,571	5,188,265	Gogra canal opened for irrigation in March, 1938.
1938-39 ..	1,886,646	3,450,038	5,336,684	
1939-40 ..	2,000,830	3,237,443	5,238,273	

Year	Total area irrigated			Remarks
	Kharif	*Rabi*	Total	
	Acres	Acres	Acres	

UNITED PROVINCES

Financial results of Productive Works

Year	Capital outlay, direct and indirect, to end of the year	Interest charges to end of the year	Net revenue to end of the year	Accumulated profits to end of the year (column 4 less column 3)	For the year: Gross revenue	Working expenses	Net revenue	Percentage on capital
1	2	3	4	5	6	7	8	9
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1921-22 ..	11,17,81,018	16,10,83,776	28,48,10,868	12,37,27,092	1,36,45,152	49,73,526	86,71,626	7·76
1922-23 ..	11,76,91,348	16,49,44,077	29,29,98,960	12,80,54,883	1,32,03,527	50,15,435	81,88,092	6·96
1923-24 ..	12,85,42,627	16,92,89,846	30,25,72,250	13,32,82,404	1,45,07,503	49,34,213	95,73,290	7·45
1924-25 ..	14,08,16,550	17,42,91,775	30,90,31,467	13,47,39,692	1,11,43,762	46,84,545	64,59,217	4·59
1925-26 ..	15,32,42,587	17,99,35,258	31,72,96,991	13,73,61,733	1,30,69,660	47,94,691	82,74,969	5·40
1926-27 ..	16,68,20,282	18,62,44,093	32,75,66,122	14,13,22,029	1,56,32,582	53,63,451	1,02,69,131	6·16
1927-28 ..	18,17,95,427	19,32,63,169	33,76,72,256	14,44,09,087	1,56,41,737	55,35,603	1,01,06,134	5·56
1928-29 ..	19,83,19,816	*20,11,86,853	34,67,17,278	14,55,30,425	1,43,57,039	53,12,017	90,45,022	4·56
1929-30 ..	21,23,98,740	20,97,80,678	35,92,54,040	14,94,73,362	1,94,49,171	69,12,409	1,25,36,762	5·90
1930-31 ..	22,00,25,636	21,89,80,405	37,01,04,547	15,11,24,142	1,86,07,152	77,56,645	1,08,50,507	4·93
1931-32 ..	22,27,31,518	22,83,39,662	37,98,64,996	15,15,25,334	1,68,02,886	70,42,437	97,60,449	4·38
1932-33 ..	22,01,71,326	23,77,41,654	39,27,26,011	15,49,84,357	1,99,59,140	70,98,125	1,28,61,015	5·84
1933-34 ..	22,18,20,969	24,70,55,111	40,43,88,547	15,73,33,436	1,90,86,549	74,24,013	1,16,62,536	5·26
1934-35 ..	22,45,31,528	25,61,65,312	41,50,22,554	15,88,57,242	1,82,48,781	76,14,774	1,06,34,007	4·74
1935-36 ..	23,39,05,582	26,52,46,138	42,97,69,937	16,45,23,799	2,24,47,310	76,99,927	1,47,47,383	6·30
1936-37 ..	24,89,28,781	27,46,06,801	44,41,88,230	16,95,81,429	2,33,50,250	89,31,957	1,44,18,293	5·79
1937-38 ..	25,72,27,571	28,43,10,076	45,78,74, 867	17,35,64,791	2,32,06,411	95,19,774	1,36,86,637	5·32
1938-39 ..	25,93,44,766	29,42,11,605	47,44,19,707	18,02,08,102	2,74,24,431	1,08,79,591	1,65,44840	6·38
1939-40 ..	26,13,29,119	30,41,84,431	49,30,57,888	18,88,73,457	2,98,78,082	1,12,39,901	1,86,38,181	7·13

NOTE—Financial results from 1921-22 are shown under the new heads owing to change in classification from April 1, 1921. Rohilkhand canals were transferred to "Productive" and the rest of the "Minor Works" together with all "Protective Works" to "Unproductive". Rohilkhand canals retransferred from Productive to Unproductive Works from 1931-32 and Dun and Garai canals transferred to Unproductive from 1932-33.

* Includes Rs.1,25,335 on account of interest accrued from 1919-20 to 1928-29 on the survey charges not brought into the Administrative accounts of previous years.

UNITED PROVINCES

Financial results of Unproductive Works

Year		Capital outlay, direct and indirect, to end of the year	Interest charges to end of the year	Net revenue to end of the year	Accumulated profits to end of the year (column 4 less column 3)	For the year			
						Gross revenue	Working expenses	Net revenue	Percentage on capital
1		2	3	4	5	6	7	8	9
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
1921-22	..	2,83,84,481	1,51,84,998	−5,08,985	−1,56,93,983	9,13,274	7,92,064	1,21,210	0·43
1922-23	..	2,88,36,709	1,61,61,733	−6,20,213	−1,67,81,946	7,10,857	8,22,085	−1,11,228	−0·39
1923-24	..	2,91,58,650	1,71,64,630	−7,86,278	−1,79,50,908	6,70,385	8,36,450	−1,66,065	−0·57
1924-25	..	2,93,59,847	1,81,88,980	−10,69,739	−1,92,58,719	5,41,227	8,24,688	−2,83,461	−0·96
1925-26	..	2,97,39,571	1,92,08,537	−12,43,974	−2,04,52,511	6,88,669	8,62,904	−1,74,235	−0·59
1926-27	..	3,00,86,721	2,02,71,869	−16,22,039	−2,18,93,908	6,56,744	10,32,204	−3,75,460	−1·25
1927-28	..	3,05,15,089	2,12,43,045	−20,08,595	−2,32,51,640	8,06,526	11,93,032	−3,86,506	−1·27
1928-29	..	3,11,15,140	2,23,21,754	−26,23,697	−2,49,45,451	4,10,045	10,25,147	−6,15,102	−1·98
1929-30	..	3,11,35,569	2,34,20,559	−25,80,829	−2,60,01,388	10,55,817	10,12,949	42,868	0·13
1930-31	..	3,11,86,812	2,92,33,419	−10,46,226	−3,02,79,645	11,61,686	10,84,002	77,684	0·25
1931-32	..	3,35,50,216	3,04,60,948	−11,03,686	−3,15,64,634	8,33,020	8,90,440	−57,420	−0·17
1932-33	..	3,71,72,914	3,52,29,586	24,78,398	−3,27,51,188	11,21,210	11,12,822	8,388	0·02
1933-34	..	3,71,76,021	3,65,88,652	28,52,472	−3,37,36,180	14,50,438	10,76,364	3,74,074	1·00
1934-35	..	3,72,35,436	3,79,34,888	31,79,322	−3,47,55,566	13,75,105	10,48,255	3,26,850	0·88
1935-36	..	3,73,03,188	3,92,75,807	39,77,506	−3,52,98,301	18,14,223	10,16,039	7,98,184	2·14
1936-37	..	3,71,34,732	4,06,02,958	46,92,099	−3,59,10,859	17,33,966	10,19,373	7,14,593	1·92
1937-38	..	3,67,69,387	4,18,92,200	50,46,264	−3,68,45,936	13,46,365	9,92,200	3,54,165	0·96
1938-39	..	3,68,11,077	4,31,63,999	61,28,152	−3,70,35,847	20,45,585	9,63,697	10,81,888	2·94
1939-40	..	3,69,31,445	4,44,38,600	70,19,754	−3,74,18,846	17,97,608	9,06,006	8,91,602	2·41

NOTE—Financial results from 1921-22 are shown under the new heads owing to change in classification from April 1, 1921. Rohilkhand canals were transferred to "Productive" and the rest of the "Minor Works" together with all "Protective Works" to "Unproductive." Rohilkhand canals retransferred from Productive to Unproductive Works from 1931-32 and Dun and Garai canals transferred to Unproductive from 1932-33.

Government of the United Provinces

PUBLIC WORKS DEPARTMENT

IRRIGATION BRANCH

No. $\frac{19}{86B\text{-}16A/1939\text{-}40}$ I. B.

Dated Lucknow, February 20, 1941

RESOLUTION

READ :

The Administration Report for the year ending March 31, 1940.

Capital outlay—The capital outlay, both direct and indirect, on canals, hydro-electric works and other irrigation schemes to the end of the year was :

—	During 1939-40			To end of 1939-40		
	Direct	Indirect	Total	Direct	Indirect	Total
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Productive ..	20,00,487	29,276	20,29,763	25,12,40,484	1,00,88,635	26,13,29,119
Unproductive ..	1,18,901	1,467	1,20,368	3,55,86,905	13,44,540	3,69,31,445
Total ..	21,19,388	30,743	21,50,131	28,68,27,389	1,14,33,175	29,82,60,564

The capital expenditure on "Productive" works was mainly on :

	Rs.
(1) Ganges canal	49,093
(2) Eastern Jumna canal	85,176
(3) Sarda canal (including Sarda extension project) ...	5,38,876
(4) State tube-wells	5,86,250
(5) Hydro-electric grid	9,49,782
(6) Fyzabad electricity and Gogra pumping scheme ...	1,30,190

The Daurala sugarcane tramway, which was run at a loss, was sold for Rs.2,65,000.

As regards "Unproductive" works the only important items of expenditure were (i) the Kewar *nadi* project, designed to tap the waters of the Kewar *nadi* for a chain of tanks in the most precarious tract round Jagnair in the Agra district and (ii) the construction and extension of channels in Bundelkhand.

2. *Financial results*—The gross revenue (direct and indirect) realized from irrigation works in the Province, including the Hydro-electric grid and tube-wells, during the year under review (*rabi* 1938-39 and *kharif* 1939) was Rs.3,16,75,690 and the net revenue Rs.1,95,29,783 as compared with Rs. 2,94,70,016 and Rs. 1,76,26,728, respectively, in the preceding year. The increase in revenue was due to (i) an increase in the sugarcane area occasioned by a rise in the price

of *gur*, (ii) the development of irrigation on the tube-wells, and (iii) the remodelling of certain channels and the construction of new minors. The net revenue from "Productive" works gave a return of 7·13 per cent. on the capital expenditure of Rs.26,13,29,119 and, after paying interest charges, the net profit was 3·32 per cent. The corresponding figures for the previous year were 6·38 and 2·56 per cent. respectively.

Excluding new schemes which have not yet been fully developed, namely the Sarda and Ramganga canals, the State tube-wells, the Hydro-electric grid, the Fyzabad electricity and Gogra pumping scheme and the Daurala sugarcane tramway, the net revenue from "Productive" works showed a return of 12·56 per cent. or a net profit of 9·34 per cent. after paying interest charges, as compared with 12·30 and 9·02 per cent. respectively, in 1938-39. The Sarda canal has been disappointing so far and is responsible for a recurring net loss of over 23 lakhs a year. The recent extensions towards Haidergarh and Allahabad are expected to reduce the loss and even to turn the scheme into a profitable concern. The Gogra pumping scheme has shown a loss of about 1·5 lakhs, but it is still in its infancy and on maturity it will pay. The only other scheme which does not give any promise of even paying its way, is the Ramganga canal. In 1939-40, it suffered a net loss of Rs.94,622. Government are considering proposals to remodel the scheme to make it profitable.

The loss on "Unproductive" canals was 1·04 per cent. as compared with 0·52 per cent. in the previous year.

3. *Agricultural*—Weather conditions were generally normal in the early part of the *kharif* season, and the demand for canal water was keen. The monsoon broke in the third week of June; the rainfall in July, August and the first half of September was fairly good in the eastern parts of the Province but poor in the west where the demand for canal water was keen during August and the first half of September. The rain in the middle of September was general and rendered *paleo* for *rabi* unnecessary. The monsoon withdrew in the third week of September, though a few light and scattered showers fell in October. The demand for canal water for *rabi* crops was keen during November and December, as the winter rains held off until the middle of January, when they were well distributed and were followed by light showers in February and March. Supplies in most of the rivers were abnormally low, and had it not been for the timely rain in January, widespread remissions would have been necessary. The total area irrigated by canals in the United Provinces was 5,238,273 acres, as compared with 5,336,684 acres in 1938-39. The decrease was due to the shortness of the supplies in most of the rivers and to the timely winter rains.

4. *The Ganges canal Hydro-electric grid scheme*—The total number of units sold was 71,423,639, which gave a yearly load factor of 34·7 per cent. against 39 per cent. on 73,909,777 units in the previous year. The decrease was due to the reduced demand for irrigation pumping as a result of timely rainfall in September and January. The maximum peak load was 23,765 K. W. as compared with 21,620 K. W. in the preceding year. The assessments for the year showed a net

profit of Rs.6,75,189 after meeting all working expenses, depreciation and interest charges.

5. *State tube-wells*—The total number of State tube-wells in operation at the end of the year was 1,478. The new tube-wells sanctioned in the previous year were completed and 80 further new wells were sanctioned for construction during 1940-41. The total area irrigated was 589,410 acres, as compared with 583,517 acres in 1938-39.

6. *The Fyzabad electricity and Gogra pumping scheme*—The total area irrigated during the year was 15,387 acres as compared with 12,583 acres in the previous year.

7. *General*—The undermentioned important territorial changes were effected during the year :

(1) A temporary division called the Sarda extension division consisting of three sub-divisions was created in the VI Circle from May 1, 1939, with headquarters at Unao. The divisional and sub-divisional headquarters were, however, transferred to Rae Bareli from June 1, 1939.

(2) The temporary Gogra survey division and its two sub-divisions were abolished from May 15, 1939.

(3) A temporary sub-division known as the Jumna Hydro-electric survey sub-division was created in the Northern division, Ganges canal, from October 1, 1939, for a period of 4 months, for the preparation of a project for generating electricity by utilizing the Jumna river and its tributaries above the head-works of the Western Jumna canal.

(4) The reach from mile 50 to mile 52 of the Hardoi branch, excluding the Chanderi escape and some portions of the Nawada and Kotal drains, were transferred from the Hardoi to the Shahjahanpur division, Sarda canal, with effect from October 1, 1939.

8. *Acknowledgments*—The Irrigation Branch of the Public Works Department has completed another year of its successful career. It has continued to serve the interests of the cultivators of this Province with its customary high standard of efficiency. The Governor desires to express his appreciation of its services, especially of the officers mentioned by the Chief Engineers. To the Chief Engineers, Messrs. Lyle, Abdul Aziz and Hickey, the provincial administration is greatly indebted for the zeal and devotion displayed by them in the discharge of their duties, and for maintaining the high tradition of the Irrigation Branch.

Order—Ordered that the above resolution be submitted to the Government of India and that it be published in the *United Provinces Gazette*.

Ordered also that it be circulated to other Governments and departments as usual.

By order,

WAJAHAT HUSSAIN,

Secretary to Government,

United Provinces.

[illegible] question of [illegible] deposition and [illegible].

[illegible] The [illegible] in the [illegible] year [illegible] new wells [illegible]. The [illegible] was [illegible] acres [illegible].

6. [illegible] The total area irrigated during the year was 14,387 acres [illegible] compared with [illegible] acres in the previous year.

7. *General.*—The undermentioned important territorial changes were effected during the year:—

(1) A temporary division called the [illegible] extension division [illegible] was created in [illegible] 1, 1939, with headquarters at [illegible]. The division and sub-divisional headquarters were, however, transferred to [illegible] from [illegible].

(2) The temporary [illegible] division [illegible] was abolished from May 15, 1939.

(3) A temporary sub-division [illegible] electric survey sub-division was created [illegible] the [illegible] canal, from October 4, 1939, for a period of [illegible] months for the preparation of a project for generating electricity by utilizing the [illegible] above the head works of the [illegible] canal.

(4) [illegible] mile 60 to mile 68 of the [illegible] and [illegible] were transferred from [illegible] division to the [illegible] division [illegible].

8. [illegible] the [illegible] Public Works Department [illegible] continued [illegible] report [illegible] survey [illegible] method of [illegible]. The [illegible] Two [illegible] and [illegible] were [illegible] for the [illegible] Irrigation [illegible].

ORDER.—Ordered that the above resolution be submitted to the [illegible] and [illegible] in the [illegible].

[illegible] also [illegible] and [illegible] mentioned [illegible].

[illegible]
[illegible] to Government,
United Provinces.

ADMINISTRATION REPORT

OF THE

IRRIGATION BRANCH, PUBLIC WORKS DEPARTMENT

UNITED PROVINCES

For the year ending March 31, 1940

SECTION I

FINANCIAL RESULTS

1. Capital Outlay

The net capital outlay, both direct and indirect, during the year under review, was Rs.21,50,131, viz. Rs. 20,29,763 on " Productive " and Rs.1,20,368 on " Unproductive " works.

The greater part of the capital expenditure on " Productive " works was incurred on the following schemes:

	Rs.
(1) Ganges canal	49,093
(2) Eastern Jumna canal	85,176
(3) Sarda canal (including Sarda extension project) ...	5,38,876
(4) State tube-wells	5,86,250
(5) Hydro-electric grid	9,49,782
(6) Daurala sugarcane tramway	—2,98,939
(7) Fyzabad electricity and Gogra pumping scheme ...	1,30,190

The minus expenditure on the Daurala sugarcane tramway was chiefly due to the sale of the main line and the farm siding to the Delhi Cloth and General Mills, Ltd., in October, 1939, and the credit of the sale proceeds to " Receipts and Recoveries on Capital Account."

The expenditure under the head " Unproductive " was mainly incurred on (1) the Kewar *nadi* project, which was designed to tap the waters of the Kewar *nadi* and fill in a chain of tanks in the Jagnair tract, Agra district, (2) the acquisition of land adjoining the Bijapur canal head-works, Dun canals and (3) constructing new channels for the extension of irrigation in Bundelkhand.

The progress of works is given in sections IV, VII and VIII of the report.

The table appended below gives the total capital outlay on all canal systems in the United Provinces during and to the end of the year:

—	During 1939–40			To end of 1939–40		
	Direct	Indirect	Total	Direct	Indirect	Total
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Productive ...	20,00,487	29,276	20,29,763	25,12,40,484	1,00,88,635	26,13,29,119
Unproductive ..	1,18,901	1,467	1,20,368	3,55,86,905	13,44,540	3,69,31,445
Total ...	21,19,388	30,743	21,50,131	28,68,27,389	1,14,33,175	29,82,60,564

2. Financial Results

The financial results on all irrigation works, "Productive" and "Unproductive" including the Hydro-electric grid and State tube-well schemes, as compared with the previous year, were as follows:

	1938–39	1939–40
	Rs.	Rs.
Gross revenue realized	2,94,70,016	3,16,75,690
Working expenses	1,18,43,288	1,21,45,907
Net revenue	1,76,26,728	1,95,29,783
Interest charges	1,11,73,328	1,12,47,427
Net profit	64,53,400	82,82,356

The increase in revenue and the net profit was mainly due to:

(i) the increase in the area irrigated during *kharif*, 1939, due to the expansion of sugarcane cultivation as a result of the rise in the price of *gur*.

(ii) the development of irrigation on the tube-wells.

(iii) the remodelling of certain works in the III Circle and the construction of new minors in the IV Circle.

The increase in working expenses was due to increased consumption of electrical energy on State tube-wells. This was, however, counterbalanced by a corresponding increase in the Hydro-electric revenue.

3. Review of Financial Results by Classes of Works

(1) *Productive works*—The results for the year are compared below with those of the previous year:

Year	Gross revenue realized	Working expenses	Net revenue	Interest charges	Net profit
	Rs.	Rs.	Rs.	Rs.	Rs.
1938–39 ...	2,74,24,431	1,08,79,591	1,65,44,840	99,01,529	66,43,311
1939–40 ...	2,98,78,082	1,12,39,901	1,86,38,181	99,72,826	86,65,355

The net profit on the capital outlay was 3 32 per cent. as compared with 2 56 per cent. in 1938–39. Excluding the Sarda and Ramganga canals, the State tube-wells, the Hydro-electric grid and the Fyzabad electricity and Gogra pumping scheme, which have not yet fully developed, and also the Daurala sugarcane tramway, the main line and farm siding of which were sold in October, 1939, the net profit earned by the remaining schemes was 9·34 per cent. as compared with 9·02 per cent. in 1938–39.

(ii) *Unproductive works*—The table below compares the results for the year under review with those for the preceding year:

Year	Gross revenue realized	Working expenses	Net revenue	Interest charges	Net profit
	Rs.	Rs.	Rs.	Rs.	Rs.
1938–39 ...	20,45,585	9,63,697	10,81,888	12,71,799	−1,89,911
1939–40 ...	17,97,608	9,06,006	8,91,602	12,74,601	−3,82,999

The percentage of loss on the total capital outlay was 1·04 per cent. as compared with 0 52 in the previous year.

Details of financial results of irrigation works are given in form no. 44 (abstract) of the Administrative accounts bound at the end of the report.

4. DETAILS OF GROSS REVENUE ASSESSED ON CANALS AND ON THE HYDRO-ELECTRIC AND STATE TUBE-WELL SCHEMES

The total direct and indirect revenue assessed during *kharif* 1939 and *rabi* 1939–40 as compared with that for 1938–39 is detailed in the following table :

Year	Area irrigated	Direct revenue assessed								Indirect revenue	Gross revenue assessed
		Occupiers' rate	Owners' rate	Plantation	Water power	Navigation	Miscellaneous				
							Rents, fines and other miscellaneous	Hydro-electric grid scheme	Total		
	Acres	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
1938-39 ..	5,336,684	2,28,30,797	78,331	2,46,081	86,757	9,318	5,35,570	42,58,910	2,80,45,764	27,71,558	3,08,17,322
1939-40 ..	5,238,273	2,31,04,587	75,264	2,36,706	77,849	9,548	4,78,719	38,20,806	2,78,03,479	27,93,096	3,05,96,575

The average occupiers' rate assessed per acre was 4·41 as compared with 4·28 and 4 36 in the years 1938–39 and 1937–38 respectively. There was a decrease in the total gross revenue assessed. The increase under occupiers' rate on the canals, due to the expansion of sugarcane cultivation on account of rise in the price of *gur*, was offset by a decrease on the Hydro-electric grid due to the reduction of the rate for the supply of energy to the State tube-well and pumping schemes.

SECTION II
AGRICULTURAL

1. THE SEASONS

(*a*) *Early kharif*—The weather during April and May was, generally, hot and dry. There were light scattered showers in early June.

(*b*) *Monsoon*—The monsoon arrived in the third week of June. The rainfall in July, August, and the first half of September was generally good in Bundelkhand, poor to fair in the area served by the Sarda canal, and poor in the western districts, particularly in the Aligarh and Bulandshahr canal divisions. There was general rain in the middle of September and the monsoon withdrew shortly after.

(*c*) *Rabi*—Except in the Mirzapur canals sub-division, where there were a few light and scattered showers in October, the months of October, November, December, and the first half of January were dry. There was general rain in the middle of January followed by light showers in February and March.

2. DEMAND AND SUPPLIES

(*a*) *Kharif*, 1939

(i) *Western canals*—The demand for canal water was keen during April, May, and the first half of June. It then slackened off until the

end of June, when it ceased altogether. It rose again in July. In August it was, generally, keen, and did not subside until the middle of September. Supplies were adequate, though tight in April and May. The Ganges canal ran throughout the months of July, August and early September.

(ii) *Sarda canal*—The demand was keen during April, May and the first half of June, after which it slackened off until the end of June when it ceased altogether. It rose again for a fortnight in July in the 5th Circle, and in the third week of August in the 6th Circle, where the demand for late rice overlapped the demand for *rabi paleo*. The Sarda canal ran from July 27 to August 24. Supplies were, on the whole, adequate.

(iii) *Bundelkhand and Mirzapur*—All canals ran for the irrigation of sugarcane, and for filling village tanks. Supplies were very short on the Dhasan and Betwa systems. In late *kharif* the Ken and Mirzapur canals ran for rice irrigation from the beginning of July, until the middle of August in the case of the Ken canal, and until the middle of September in the case of the Mirzapur canals.

(iv) *Tube-wells*—The demand was very keen during April, May and first half of June when it slackened until the end of July due to good rain. The demand was again keen in the second half of August and continued until the middle of September after which it ceased.

(b) *Rabi*, 1939-40

(i) *Western canals*—The general rain in the middle of September rendered *paleo* for *rabi* unnecessary, except in some places in the 2nd Circle, but demand for "kor" irrigation was keen from November onwards. Supplies in most of the rivers were abnormally low, and, had it not been for timely rain in January, widespread remissions would have been necessary.

(ii) *Sarda canal*—There was a keen demand for late rice, in the 6th Circle, which overlapped the demand for *rabi paleo*. No *paleo* was done in the 5th Circle. The demand for "kor" irrigation was keen until the January rainfall. The area was swept by two hailstorms in February and two in March, which did considerable damage, particularly in the 6th Circle, where heavy remissions were granted. Supplies were abnormally short.

(iii) *Bundelkhand and Mirzapur*—The demand throughout the season was regular. The inflow to the reservoirs for the Betwa and Dhasan systems was almost sufficient for *rabi paleo*, and the supplies in the reservoirs were only just sufficient for the *rabi* area irrigated.

(iv) *Tube-wells*—Rainfall in September resulted in very poor demand for *paleo* of *rabi*. The demand was not keen during October and until middle of November but was very keen up till the middle of January, when widespread rainfall occurred. The demand in the rest of January, February and March was not keen.

3. Rainfall

The rainfall during the year (1939-40) was generally below normal except in the Fatehpur division, Lower Ganges canal, the Lower division, Agra canal, the Dun canals, in Mirzapur and in some parts of Bundelkhand.

4. FLOODS

(i) *Western canals*—There were no high floods during the year The highest discharge of the Ganges at Raiwala was 91,121 cusecs as compared with 207,469 cusecs in the previous year.

(ii) *Sarda canal*—The Sarda river was in low flood for about a month, and the highest discharge recorded was 130,000 cusecs as compared with 379,000 cusecs in the preceding year.

The maximum gauge at the Gogra pumping station at Raunahi was R. L. 314·60 as compared with 318·70 in the previous year.

(iii) *Bundelkhand and Mirzapur*—There were no remarkable floods in any of the rivers, nor was there any special damage to the canal works.

5. AREA IRRIGATED BY CANALS

The areas irrigated during the years 1938–39 and 1939–40 are compared in the table below :

—	1938-39			1939-40			Difference
	Kharif	*Rabi*	Total	*Kharif*	*Rabi*	Total	
	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Western canals ...	1,303,413	2,093,104	3,306,517	1,342,278	1,852,641	3,194,919	−201,598
Sarda canal ..	305,651	546,693	852,344	347,487	564,619	912,106	59,762
Rohilkhand canals (proper).	31,772	18,353	50,125	38,039	14,893	52,932	2,807
Canals, lakes, tanks, etc. in Bundelkhand and Mirzapur.	84,785	315,987	400,772	89,112	336,398	425,510	24,738
Tube-wells (State) ..	139,483	444,034	583,517	155,603	433,807	589,410	5,893
Ditto (Leased)	609	1,503	2,112	546	1,549	2,095	—17
Bijnor canals ...	13,566	9,423	22,989	16,703	8,548	25,251	2,262
Ramganga canal	4,774	10,951	15,725	7,027	13,636	20,663	4,938
Gogra canal ..	2,593	9,990	12,583	4,035	11,352	15,387	2,804
Total ...	1,886,646	3,450,038	5,336,684	2,000,830	3,237,443	5,238,273	—98,411

There was an overall decrease in the total area irrigated during the year as compared with 1938–39. The *kharif* area increased due to the scanty rainfall during the monsoon and the boom in sugarcane which followed on increase in the price of *gur* and sugar while the *rabi* area decreased due to the shortness of the supplies in most of the rivers and the fact that the rain in the middle of September rendered *paleo* for *rabi* unnecessary.

The percentage of flow irrigation on the Sarda canal was slightly higher than the previous year in the Headworks, Rohilkhand canals, Unao and Lucknow divisions and lower in the other three divisions.

The area of sugarcane irrigated during the year was 723,312 acres as compared with 540,983 acres in 1938-39 and 696,378 acres in 1937-38. The increase was due to the rise in the price of *gur* and sugar. The sugarcane area irrigated by State tube-wells was 125,276 acres as compared with 77,284 acres in 1938-39.

6. Area not Matured

The total area not matured during the year was 37,486 acres as compared with 159,442 acres in 1938-39 and 35,029 acres in 1937-38.

7. Remissions

Remissions of canal dues amounting to Rs.1,95,764 as detailed below were granted, during the year, as compared with Rs.6,21,066 in the preceding year. These were sanctioned because of damage to crops by bad seed, inadequate supplies, insect pests and hailstorms :

	Rs.	
Upper Ganges canal	46,648	
Lower Ganges canal	16,563	
Eastern Jumna canal	23,423	
Agra canal including Jagnair tanks ...	13,777	
Sarda canal including Rohilkhand canals (proper)	76,456	due to hailstorms.
Bundelkhand and Mirzapur	8,517	
Bijnor and Ramganga canals	5,168	
Gogra canal	1,088	
Dun canals	278	
State tube-wells	3,846	
Total ...	1,95,764	

8. Value of Crops Irrigated

The estimated value of crops raised with the aid of State-owned irrigation works during the year amounted to Rs.35,82,55,683 as compared with Rs.29,63,79,736 in the preceding year.

9. Percentages of *Kharif* and *Rabi* Areas

The percentages of *kharif* and *rabi* areas to the total area irrigated during the year were 38 and 62 respectively as compared with 35 and 65 in the year 1938-39.

10. Drains

Various extensions and improvements to the existing surface and seepage drains in the I and the V Circles were carried out during the year.

11. Spring Levels

(*a*) *Canals*—The spring level observations on the Western canals indicated a general fall due to the poor monsoon in the previous as well as in the current year, while those on the Eastern canals showed a rise, due to the fact that the monsoon and the winter rainfall in the previous year were good.

There was no water-logging anywhere except to a minor extent in the Headworks and Shahjahanpur divisions, where it was confined to small areas along the main Sarda canal and Hardoi and Nigohi branches.

(*b*) *Tube-wells*—Springs level readings were taken in May and September, 1939, in Irrigation Development division (West) and in May and October, 1939, in other divisions of the Circle. Readings of both the months in Irrigation Development (West) and Budaun divisions and of May, 1939, in Irrigation Development division (East), showed a drop due to the poor monsoon and lack of winter rains, as compared with the previous year. October observations in Irrigation Development division (East), showed a general recovery.

12. WELLS

Particulars of wells in the United Provinces for the agricultural year 1939–40 (i.e. for the year ending June 30, 1940), are given in the table below :

Number of wells				Number of masonry wells abandoned	Area irrigated from both kinds of wells in columns 1 and 3
Masonry		Non-masonry			
Actually used	Available	Actually used	Available		
1	2	3	4	5	6
					Acres
633,770	844,012	561,402	627,852	13,068	5,807,186

SECTION III

NAVIGATION

The receipts during the year amounted to Rs.9,547 against Rs.9,286 in 1938–39. The increase of Rs.261 was due to an enhanced income from tollage on private boats and the recovery of demurrage charges from the contractors for their failure to remove their goods in the stipulated time.

The expenditure amounted to Rs.5,723 against Rs.4,568 in the preceding year the increase being due to extra expenditure under repairs in the Northern, Meerut and Cawnpore divisions.

The net profit was Rs.3,824 as compared with Rs.4,718 in the preceding year. The decrease was due to increased expenditure under repairs.

The tonnage of goods carried during the year was 24,021 valued at Rs.5,66,713. The corresponding figures of the previous year were 34,984 tons and Rs.5,20,752. The ton-mileage showed a rise from 1,314,207 to 1,685,981.

SECTION IV

WORKS COMPLETED, IN PROGRESS AND PROPOSED

1. 68*A*—*Capital*—(1) *Productive Works*—The direct capital outlay during the year on works completed and in progress (excluding the

Hydro-electric grid and development activities which form separate sections of this report), amounted to Rs.6,48,901.

(*a*) WORKS COMPLETED AND IN PROGRESS

(*i*) *Western canals*—The only important works carried out during the year, were (1) the remodelling of the Mat and Hathras branches in the Mat Branch division, Ganges canal, and (2) the remodelling of the Kallarpur distributary and the construction of the Jalalabad and Masawi distributaries in the Upper division, Eastern Jumna canal.

(*ii*) *Sarda canal*—The total direct capital outlay during the year was Rs.5,26,757, of which Rs.3,73,849 were spent on the remodelling of the Hardoi and Purwa branches in the Unao division, and the extension of the Haidergarh and Purwa branches in the Lucknow division.

(*b*) WORKS PROPOSED

(1) A project has been prepared and is under the consideration of Government for the construction of a storage reservoir, about six square miles in area, in the *khadir* of the Ganges river in Meerut district to store about 4,000 million cubic feet of water. It is proposed to fill the reservoir twice a year from an escape carrying 1,500 cusecs from the Upper Ganges canal during periods of slack demand. The stored supply will be utilized on the Lower Ganges canal in periods of keen demand and short river supplies.

(2) A survey is in progress for a reservoir, similar to (1) above, on the left bank of the Lower Ganges canal between miles 16 and 22.

(3) *Conversion of Ramganga canal into a gravity canal* – This scheme is designed to convert an annual loss of revenue of Rs.2,33,661 into a profit of Rs.1,80,166.

(4) *Construction of short minors from the Terminal distributary, Lower division, Agra canal*—This project will greatly reduce the number and lengths of the present very long water-courses, will save much water now being wasted, and will enable new irrigation to be picked up in areas which are at present beyond the commands of the existing main line outlets.

(5) *Construction of a tail fall on Nathaura escape, Hardoi branch, Shahjahanpur division, Sarda canal*—Owing to the difficulty of obtaining sheet piles due to the war, it has now been decided to postpone this work for the duration of the war.

2. (*a*) 68*A*—*Capital* (2) *Unproductive Works*—The direct capital outlay during the year amounted to Rs.1,18,901 of which a sum of Rs 57,456 was spent on the Kewar *nadi* project in the Lower division, Agra canal, and the balance on various smaller works in Bundelkhand and Mirzapur.

(*b*) WORKS PROPOSED

The following projects are under consideration :

(i) Construction of a new reservoir on the Dhasan river to increase the storage for the Dhasan canal.

(ii) Construction of a new reservoir on the Shahzad *nadi* to supplement the storage for the Betwa canal lost by the silting of the Dhukwan reservoir.

(iii) Construction of Ahraura canal, Mirzapur canals sub-division.

(iv) Construction of Ninedeh reservoir, Mirzapur canals sub-division.

(v) Construction of the Khajuri canal, Mirzapur canals sub-division.

3. *Mileage of channels*—The total length of channels in operation at the close of the year was 22,441 miles as compared with 22,394 miles in the preceding year. The increase is due to the construction of new channels.

SECTION V

ADMINISTRATION

Mr. Wajahat Hussain, I.C.S., held the post of Secretary throughout the year.

2. Mr. T. M. Lyle, C.I.E., I.S.E., held the post of Chief Engineer, Eastern Canals, throughout the year under review. Khan Bahadur M. Abdul Aziz Sahib, C.I.E., I.S.E., held the post of Chief Engineer, Western Canals, up to December 12, 1939, when he retired and was succeeded by Mr. P. F. B. Hickey, D.S.O., I.S.E.

3. Messrs. Moti Ram, I.S.E. (Western Canals), H. G. Burns, I.S.E., (Eastern Canals), and K. C. Mazumdar (Hydro-Electric), held the posts of Personal Assistants to the Chief Engineers, throughout the year.

4. The following casualties occurred in the superior establishment of the Irrigation Branch :

(1) Mr. M. R. Richardson, C.I.E., Chief Engineer—Retired.
(2) K. B. M. Abdul Aziz Sahib, C.I.E., Ditto.
(3) R. B. Madan Gopal Sardana Sahib, Superintending Engineer—Retired.
(4) R. B. Devi Ditta Mal Sahib, Executive Engineer—Retired.
(5) Mr. C. W. Lacey, ditto.
(6) Mr. R. A. Bradshaw-Smith, ditto.
(7) R. S. Ram Narain, Assistant Engineer—Retired.
(8) Mr. Vehari Lal Gupta, ditto.
(9) Mr. Sasi Pada Dass, Assistant Engineer (Hydel). Died.
(10) Mr. Akhtar-ul-Islam Khan, Temporary Assistant Engineer—Left the department.

5. The undermentioned territorial changes were effected during the year :

(1) The headquarters of the 1st Sub-division, North Hydro-electric division, were transferred from Bahadrabad to Roorkee with effect from July 15, 1939.

(2) The reach from mile 50 to mile 52 of the Hardoi branch excluding the Chanderi escape, was transferred from the Hardoi to the Shahjahanpur division with effect from October 1, 1939.

(3) Some portions of the Nawada and Kotal drains were transferred from the Hardoi to the Shahjahanpur division.

(4) A temporary division known as the Sarda Extension division was formed in the VI Circle with effect from May 1, 1939, with headquarters at Unao, and comprising three sub-divisions of which one was originally created in the Unao division but was transferred to the new division on its formation. The headquarters of this new division and its three sub-divisions were transferred from Unao to Rae Bareli with effect from June 1, 1939. The 2nd sub-division of this division was abolished on February 7, 1940, on account of Government's decision to close down the work of extending the Sarda canal during the war. (Government eventually, however, on reconsideration, ordered the work to be completed and the third sub-division was reconstituted in April, 1940.)

(5) A sub-division known as the Jumna Hydro-electric Survey sub-division was formed in the Northern division, Ganges Canal, with effect from October 1, 1939, for a period of 4 months, for the preparation of a project for generating Hydro-electric power from the Jumna river and its tributaries, above the headworks of the Western Jumna canal.

(6) The Gogra Survey division with its two sub-divisions was abolished with effect from May 15, 1939.

6. The staff of the Western Canals were again subjected to an unusual strain owing to record demand and low river conditions.

The Chief Engineers wish to record their special appreciation of the work of the following officers :

Superintending Engineers—Rai Bahadur Lala Madan Gopal Sardana, Messrs. L. E. Dawson, Gerald Lacey, Mohsin Ali, F. H. Hutchinson, W. M. G. Dawson, Anand Prakash Watal and A. N. Lyle.

Hydro-electric Engineers.—Messrs. E. C. B. Walton and J. J. B. Campbell.

Executive Engineers—Messrs. Avadh Vehari Gupta, Sumer Chand and J. W. Russell, Rai Bahadur Lala Durga Prasad Rohatgi, Messrs. Akhil Chandra Mitra, Bhagwati Prasad Saxena, Ram Chandra Sahai, Krishna Narain Kathpalia, Baij Nath Khattri, G. W. Nash, Lakshman Prasad Bhargava, Manohar Lal Sood, Yadava Mohan, G. E Hartley, R. G. Smith, Balwant Singh Nag, Daya Ram, Chandra Lal, Khushi Ram Camra, K. Brown, Shaukat Omar and A. G. Brown.

Personal Assistants to Chief Engineers—Messrs. Moti Ram, H. G. Burns and Khirode Chandra Mazumdar, rendered loyal and efficient help.

SECTION VI
IRRIGATION RESEARCH

During the year under review Mr. G. E. Hartley, I.S.E., continued to hold the post of Irrigation Research Officer, in addition to his duties as Executive Engineer, Lucknow division. Mr. J. P. Jain, Assistant

Engineer held the post of Assistant Research Officer and Mr. A. P. Bhattacharya that of Statistical Officer.

Work during the year may be grouped under the following headings:

Canal and gul losses—The idea of lining the Agra Park minor with sodium carbonate was dropped, as the losses were of a very low order.

Losses were determined for the Sarda main canal and the Hardoi branch by the analysis of automatic gauges. Figures for the former were absurdly low and call for further investigation.

Observations of losses on cultivators' guls were continued at the Agricultural Farm, Bara Banki, to compare figures obtained by the compartment method and by the discharge method for which two V notches were installed. The former gave slightly higher figures than the latter. The "Chicken Feed" apparatus was also tested in the field and gave results similar to those obtained in the laboratory.

Lining of channels and guls—Observations were made this year on lined channels and they confirmed last year's conclusions arrived at from laboratory experiments. Work in the University laboratory, started last year, was continued. The main conclusions were (1) that soils with clay contents lower than about 4 per cent. cannot be profitably treated with sodium carbonate, (2) that the optimum quantity of soda to be used for all soils above this limit of clay contents is about 6 per cent. by weight of soil, (3) that sodium carbonate can very economically be replaced by naturally occurring alkali, namely "Usar." These results have yet to be confirmed by further experiments.

The experimental Bitumal lining and the Mastic lining with lime concrete base were kept under observation. They are still quite effective. A cheaper lining known as Mastic no. 2 with a mud concrete base was also tried.

Tube-well investigations—Statistics of spring levels maintained in tube-well areas show that the level of the water surface decreased by 2·5 feet to 4 feet between September, 1936 and September, 1939.

The investigation of the draw-down observations made during 1938 on the experimental wells bordering the Ganges canal shows in general that the line forming the perpendicular from the well to the canal gives the maximum yield. Seepage, therefore, is probably greater along this line.

Model Experiments

Flumed fall at M.18-1-495, Mat branch—Experiments were carried out (i) to see if the size and position of the baffle as suggested by the Research section before were correct, and (ii) to find out the best device for counteracting scour under the present conditions of the fall with 1 in 10 splay of the D. S. transition.

The results confirmed the previous recommendations of the Research section for a 1 in 5 D. S. transition, while for 1 in 10 splay, the position was a little different, the size of the baffle remaining the same. These experiments also showed that smooth entry of the stream is essential for flumed works.

Purwa branch Sarda Canal.—Experiments were conducted (*a*) to decide the extent to which works could be flumed safely and economically and the most suitable form of flumed bridges, (*b*) to find out if there would be any drop in the existing water level when the branch was widened to the proposed section in compartments, with "tattis" left at every furlong or half furlong.

In case of (*a*), hyperbolic transitions gave the best results, and it was found that works on the Purwa branch can be flumed quite safely up to one-third of the bed width of the channel, but for economy the fluming ratio should not be below 40 per cent.

In case of (*b*), there was no change in the water level, when one or both sides of the channel were cut, and irrespective of whether "tattis" were left at intervals of one furlong or half a furlong.

Proposed rapid at the tail of the existing falls at M. 0-3-461 of the Nathaura escape—Experiments were carried out to find out the best method of reducing scour downstream of the rapid A combination of 12″ high rectangular baffles gave the best results.

Silt selective heads—King's vanes and the Russell head are found to be working most satisfactorily.

Experiments were initiated on a venturi head on one of the channels of the Sarda canal to observe accurately all the variables to which the silt load is subjected for a year or so and then build another head on it and observe again and thus determine by progressive elimination of these variables the comparative efficiency of different types of silt selective heads in the field in the course of a few years.

Silt sampling at the Sarda canal headworks was continued.

Silt Observations

Bed silt samples from various parts of the Province were analysed with the Puri Siltometer. About 600 water samples were analysed to determine silt load in suspension.

Recording of the canal water temperature continued.

Agricultural Co-operation

Experiments on the water requirements of crops were started this *rabi* at the Bara Banki Farm under the dual supervision of the Irrigation and Agricultural officers. Data, when analysed, showed very high water depths both for wheat and gram, the two main *rabi* crops, while the yield was poor in both cases.

Miscellaneous and Advisory

The work done under this head may be summarised below ;

(1) Fluming of structures.

(2) Calibration of falls.

(3) Silt sampling of the Gogra river at the Raunahi pumping station.

(4) Dungia feeder (Mirzapur).

(5) Evaporation from reservoirs.

(6) Use of tar for painting steel-work.

(7) Determination of factors at head of distributaries.

Expenditure

During the year under review the entire expenditure on research was Rs.20,088.

SECTION VII

HYDRO-ELECTRIC GRID SCHEME

1. *Project*—The necessity for a second steam station to supplement the Chandausi steam station in taking the grid load during Ganges canal closures in the monsoon was realized, and the new station was located at Moradnagar, which lies near the centre of the loads in the Western part of the grid. Project work in connexion with this power station was completed during the year.

An out-door 66 K.V./37 K. V. transforming station was also projected at Moradnagar to fit in later on with the steam station when the latter was ready.

Some extension of the supply to new consumers was also made during the year. The work of replacing all *sal balla* supports by steel rails was practically completed.

2. *Capital outlay*—The net direct and indirect outlay during the year under 68A—Capital—(1) Productive Works, Loan Funds, was Rs.9,49,782. The works expenditure amounted to Rs.10,02,843, while receipts on the capital account amounted to Rs 1,78,005.

3. *Improvements*—In certain sections of the 37·5 K. V. lines, straight cross arms were converted to V and U type arms in order to minimise earth faults due to birds perching on them.

The arrangements for the supply of electricity were improved at Shamli, Lhaksar, Chandpur town, and Chandpur railway station.

4. (*a*) *Power generation*—The total generating capacity on March 31, 1940 was 29,700 K. W. of which 18,900 K. W. was due to hydro-stations, 9,000 K. W. to steam stations and 1,800 K. W. to oil engine stand-by plant.

(*b*) *Transmission*—The total mileage of transmission lines in operation up to the end of March, 1940 was 4,218·9, out of which 2,576 miles were rural lines.

(*c*) *Transformation*—The total number of transformers installed in the main sub-stations on March 31, 1940 was 275 and in rural areas 1,719.

5. *Load development*—The peak load during the year rose to 23,765 K. W. as against 21,620 K. W. in December, 1938. The total number of units sold was 71,423,639 during 1939-40 as compared with 73,909,777 of last year. The reduction was due to the reduced demand during September and October and to the early rain in January and the consequent reduction in the pumping load. The yearly load factor on units sold was 34·7 per cent. as compared with 39 per cent. last year. The total industrial connected load at the end of March, 1940 was 13,681 H. P. showing an increase of 2,248 H. P. The agricultural connected load increased to 3,875 H. P. from 3,514 H. P. last year.

6. *Revenue*—The total gross revenue assessed during the year was Rs.38,03,454 as compared with Rs.40,00,522 in the previous year.

Of this revenue Rs.17,62,685 were assessed in the urban areas and Rs.4,03,663 in the rural areas excluding the revenue earned from State tube-wells and other State pumping schemes, which brought in Rs.16,37,106 as against Rs.20,37,213 last year. The reduction is due to the reduced rates now being paid for power by the State tube-wells and pumping schemes.

7. *Depreciation*—Rs.7,98,341 were contributed towards the depreciation fund which stood at Rs.29,95,920 at the close of the year. After making a deduction of Rs.8,04,000 for the years 1934-35 and 1935-36, during which no depreciation was paid, under the orders of Government, and the amount withdrawn from the fund during the year, the net amount of depreciation accumulated up to March 31, 1940, comes to Rs.20,47,962.

8. *Working expenses and operating ratio*—The working expenses including depreciation and the share of the establishment charges chargeable to revenue accounts were Rs.17,84,872 excluding the interest charges for the year, which amounted to Rs.13,73,875. The operating ratio (or proportion of working costs, excluding interest, to gross revenue earned) was 47·5 per cent. as against 38·3 per cent. of the previous year. The rise is due to the reduction in the rates paid by the State tube-wells and pumping schemes, as mentioned above, and to the increase in the depreciation charges.

SECTION VIII

DEVELOPMENT ACTIVITIES

1. *Project*—It was realized that due to the rapid growth of the steady basic load on the grid, the 9,000 K. W. steam station at Chandausi was very soon not going to prove adequate for meeting the demand during the periods when the Ganges canal has to be closed for necessary annual repairs. Another 6,000 K. W. steam station at Moradnagar, which is at the centre of the grid was, therefore, projected. Work on this scheme was, however, temporarily suspended as the possibility of generating great quantities of power at a cheap rate from the Jumna river in the west of Dehra Dun district and supplementing the grid supply by such power appeared promising as a result of a preliminary survey done during the year. Further detailed survey for this Jumna Hydro-electric scheme was, therefore, ordered.

Work of construction of the new tube-wells sanctioned in the previous year was completed. In the north-western districts tube-wells had proved of great help during the two successive years of scanty rainfalls in winter and a further 80 new wells were ordered to be constructed next year. Proposal for more extensive surveys for further expansion of the State tube-well scheme was also approved. Provisions for the survey were included in the ensuing year's proposals.

Ganges Valley State tube-well scheme—The total number of wells running at the end of the year was 1,478.

The total capital outlay during the year was Rs.5,86,250 as compared with Rs.6,23,918 in the previous year. The total area irrigated from State tube-wells was 589,410 acres as compared with 583,517 acres in the previous year. The total revenue assessed from tube-well irrigation

was Rs.31,49,982 as against Rs.34,01,661 in the previous year. This resulted in a net loss of Rs.90,864 after meeting working expenses and interest charges. Demand during *kharif* was keen. Rainfall during September resulted in a very poor demand in the beginning of *rabi*. Demand, however, improved from the middle of November and remained keen till the middle of January when there was general rainfall. There was again rain in February and very little irrigation was done till the end of the season except in the western districts during the latter half of March.

Daurala sugarcane tramway—The main line and farm siding were sold to the Delhi Cloth and General Mills, Ltd., in October, 1939. The Khatauli branch only is now operated by the Department. This branch conveyed 37,000 tons of sugarcane during the year as compared with 16,000 tons in the previous year.

Fyzabad electricity and Gogra pumping scheme—The Gogra canal irrigated 4,035 acres in *kharif* 1939 and 11,352 acres in *rabi*, 1939-40.

During 1939 considerable difficulty was experienced with the pumps at the Raunahi pumping station, but after the original metal bearings on the main shaft were replaced by special rubber bearings, they gave no further trouble.

The total capital expenditure incurred during the year was Rs.1,30,190.

APPENDICES

Statement of canals in the United Provinces for the year 1939–40

—		I Ganges canal	II Lower Ganges canal	III Eastern Jumna canal	IV Agra canal	V Sarda canal	VI Bijnor canals	VII Ram-ganga canal	VIII Fyzabad electricity and Gogra canal	IX State tube-wells	X Private tube-wells taken on lease	XI Hydro-electric grid	XII Rohil-khand canals	XIII Dun canals	XIV Betwa canal	XV Dhasan canal	XVI Pahuj and Garhmau canals	XVII Ken canal
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Source of supply	River	Ganges	Ganges	Jumna	Jumna and Hindan	Sarda, Deoha, Bahgul and Absara	Kho, Sukhrao and Gangan	Ram-ganga	Gogra	..	..	..	Rivers in Bareilly and Tarai districts	Jumna, Tons, Rispana, Song and Jakhan	Betwa	Dhasan	Pahuj	Ken
Minimum discharge of river. Ever recorded	Cusecs	4,092	1,000	2,099	..	3,290	9·0	50·4	..	..	..	..	32	39	..	..	..	63
Minimum discharge of river. During the year	,,	4,787	1,842	2,099	..	4,600	24	75	8,515	..	..	..	55	40	..	..	..	63
Maximum discharge of canal. As designed	,,	8,041	4,100	2,266	1,800	9,500	180	200	160	..	..	..	1,141	250	1,000	937	126	1,000
Maximum discharge of canal. During the year	,,	7,811	5,380	2,289	1,792	9,145	180	200	180	..	..	..	510	381	1,426	889	140	1,000
Average annual rainfall ..	Inches	28·67″	32·00″	32·00″	25·18″	40·73″	44·80″	36·90″	39·73″	31·14″	29·20″	..	48·10″	84·90″	31·70″	36·00″	32·56″	39·90″
Gross area commanded ..	Acres	5,350,500	6,764,900	1,341,800	1,397,200	8,251,881	372,900	102,127	149,546	1,545,118	5,749	..	243,493	60,900	1,299,800	415,000	65,500	849,000
Culturable area ,, ..	,,	3,927,679	5,027,000	1,191,500	1,241,400	6,997,391	321,800	96,418	130,409	1,418,462	5,323	..	209,649	45,900	1,011,300	335,400	51,300	763,000
Area irrigable by complete project	,,	1,654,500	1,350,100	410,000	409,400	1,548,729	35,500	48,209	43,843	582,420	2,180	..	90,850	26,300	196,200	104,400	18,500	152,200
Area irrigable at present ..	,,	1,553,800	1,049,300	390,000	390,300	1,548,729	35,800	48,209	43,843	582,420	2,180	..	86,523	25,000	177,100	78,000	6,400	79,500
Sanctioned estimate—																		
Direct charges	Rs.	4,21,59,283	3,88,82,301	57,49,504	1,15,89,033	9,54,86,088	5,53,832	25,33,961	16,31,628	1,42,32,093	16,566	3,49,33,465	20,94,739	26,03,844	82,28,992	48,46,936	8,21,199	59,42,910
Indirect charges	,,	23,62,540	28,61,929	3,48,564	8,52,218	31,74,780	40,463	19,725	69,692	99,600	129	2,44,715	1,52,488	73,238	3,45,229	2,14,208	20,567	2,06,303
Interest during construction	,,	18,84,685	26,38,563	..	8,65,391	1,64,50,073	..	..	..	..	..	..	..	..	7,97,254	4,37,203	63,730	9,80,979
Total, Estimate ..	,,	4,64,06,508	4,43,82,793	60,98,068	1,33,06,642	11,51,10,941	5,94,295	25,53,686	17,01,320	1,43,31,693	16,695	3,51,78,180	22,47,227	26,77,082	93,71,475	54,98,347	9,05,496	71,30,192
Expenditure to end of 1939-40—																		
Direct charges	Rs.	4,24,21,786	3,91,87,729	57,74,700	1,15,34,671	9,65,09,629	5,53,832	25,33,961	23,35,313	1,42,32,025	16,566	3,58,20,487	21,79,662	26,12,878	82,70,693	48,46,936	8,17,337	59,10,217
Indirect charges	,,	23,49,868	28,61,929	3,48,564	8,52,218	31,76,967	40,463	19,725	49,938	1,34,630	135	2,43,645	1,52,488	73,238	3,44,006	2,14,208	20,077	2,02,678
Interest during construction ..	,,	17,26,494	30,54,477	..	8,65,391	2,06,34,613	..	..	..	..	..	84,18,990	..	..	8,42,824	3,69,326	48,591	3,99,487
Total, Expenditure ..	,,	4,64,98,148	4,51,04,135	61,23,264	1,32,52,280	12,03,21,209	5,94,295	25,53,686	23,85,251	1,43,66,655	16,701	4,44,83,122	23,32,150	26,86,116	94,57,523	54,30,470	8,86,055	65,12,382
Works as sanctioned—																		
Main canal, irrigation ..	Miles	213	62	129	100	27	..	..	..	..	..	..	..	..	19	20	..	37
Branches, ,, ..	,,	355	600	..	..	885	..	..	..	..	..	..	..	..	138	87	..	49
Distributaries, ,, ..	,,	3,379	3,159	809	900	3,370	78	101	120	..	..	..	278	91	615	186	67	259
Of above—																		
Navigable channels ..	,,	213	123	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Works completed to end of 1939-40—																		
Main canal, irrigation ..	Miles	213	62	129	100	27	..	..	..	..	..	..	..	..	19	20	..	37
Branches, ,, ..	,,	355	600	..	..	885	..	..	..	..	..	..	..	..	138	87	..	49
Distributaries, ,, ..	,,	3,379	3,159	809	900	3,370	78	101	120	..	..	..	278	91	615	186	67	259
Of above—																		
Navigable channels	,,	213	123	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

II-A

Statement of Reservoirs in the United Provinces for the year 1939–40

—		Barwar lake and canal	Siaori lake	Lakes and tanks in Jhansi district	Majhgawan tank	Aunjhar tank	Raipura tank	Belasagar tank	Kamalpura tank	Jaiwanti tank	Tanks in Banda district	Lakes and tanks in Hamirpur district	Ghagar canal including Garai canal	Ghori canal	Sukhra canal	Tanks, Agra district, (Kitham and Jagnair tanks)
1		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Source of supply—		Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall	Rainfall
If supplied by rainfall { Area of catchment	Sq. miles	65	24	219	30	6·25	10·50	38·67	6·70	13·75	25·46	62·60	339	14	5·75	22·88
If supplied by rainfall { Average annual rainfall.	Inches	33·47″	33·47″	..	36·00″	36·00″	35·00″	36·00″	31·20″	35·00″	36·00″	36·00″	45·00″	46·00″	46·00″	25·00″
Contents of tanks between levels of surface of full supply and sill of canal head sluice.	M. cubic feet	1,117	269·51	931	946	158·8	343·5	630·3	175	234·5	1,128·5	1,025	5,922	350	260	246·4
Area of surface at full supply	Acres	2,485	813	2,936	1,475	200	746	2,315	513	688	1,611	3,849	9,326	745	570	2,581·23
Gross area commanded ..	,,	25,885	7,518	68,307	24,700	4,469	12,985	34,712	4,045	10,965	17,817	12,909	484,400	12,000	18,000	10,730
Culturable area commanded	,,	17,746	7,313	63,363	22,100	4,469	12,582	34,712	2,102	10,965	15,878	10,009	438,300	11,000	15,000	10,140
Area irrigable by complete project.	,,	7,200	4,000	14,565	7,000	1,825	3,246	3,000	1,750	2,141	6,563	5,104	87,000	7,000	5,000	5,390
Area irrigable at present ..	,,	2,719	3,490	11,722	4,600	600	1,054	3,000	515	250	3,544	5,029	55,000	2,000	2,000	5,390
Wells supplied by tanks ..	Nos.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	205
Sanctioned estimate—																
Direct charges ..	Rs.	7,68,136	1,81,572	1,98,535	4,56,679	4,60,285	3,64,232	5,74,580	3,30,608	9,73,130	5,23,315	1,55,180	50,42,576	4,09,927	2,23,464	3,04,357
Indirect charges ..	,,	29,055	4,743	11,293	16,485	12,189	21,443	8,922	4,033	34,592	22,913	6,916	1,35,754	11,291	6,887	15,615
Interest during construction.	,,	..	..	..	44,195	..	..	..	..	..	..	..	4,74,599	53,250	..	..
Total, Estimate ..	,,	7,97,191	1,86,315	2,09,828	5,17,359	4,72,474	3,85,675	5,83,502	3,34,641	10,07,722	5,46,228	1,62,096	56,52,929	4,74,468	2,30,351	3,19,972
Expenditure to end of 1939-40—																
Direct charges ..	Rs.	7,58,855	1,81,572	1,98,535	4,56,679	4,60,285	3,64,232	5,74,580	3,30,608	9,73,130	5,23,315	1,55,180	50,44,924	4,09,927	2,23,464	2,93,846
Indirect charges ..	,,	27,867	4,743	11,293	16,485	12,189	21,443	8,922	4,033	34,592	22,913	6,916	1,35,754	11,291	6,887	12,517
Interest during construction.	,,	..	..	..	36,251	..	..	..	..	..	..	..	4,34,273	49,307	..	..
Total, Expenditure..	,,	7,86,722	1,86,315	2,09,828	5,09,415	4,72,474	3,85,675	5,83,502	3,34,641	10,07,722	5,46,228	1,62,096	56,14,951	4,70,525	2,30,351	3,06,363
Works as sanctioned—																
Dam (earth or masonry), total height.	Feet	57·1	41·15	..	55·7	70·6	42	18	40	50·7	..	.. }	68 Ghagar } 63 Garai }	45·5	40	..
Canals	Miles	..	..	..	..	..	..	..	..	..	..	..	67	..	..	..
Distributaries ..	,,	22	14	77	30	7	10	38	6	12	22	21	170	11	7	..
Works completed to end of 1939-40—																
Dam (height completed)	Feet	57·1	41·15	..	55·7	70·6	42	18	40	50·7	..	.. {	68 Ghagar } 63 Garai }	45·5	40	..
Canals ..	Miles	..	..	..	..	..	..	..	..	..	..	..	67	..	..	..
Distributaries ..	,,	22	14	77	30	7	10	38	6	12	22	21	170	11	7	..

I.B

Capital Account of the Irrigation Works in the United Provinces for and to end of the year 1939–40

Irrigation works		Direct charges (net expenditure)							Indirect charges excluding interest	Total capital outlay excluding interest	Simple interest
		Works	Establishment	Tools and plant	Suspense	Loss by exchange	Extraordinary replacements	Total			
PRODUCTIVE WORKS—A.—IRRIGATION WORKS		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Upper Ganges canal ..	To end of previous year ..	3,28,97,202	59,55,652	12,06,198	2,83,784	90	20,35,277	4,23,78,203	23,49,468	4,47,27,671	9,26,07,458
		(a) −1,277	(a) −2					(a)−1,279		(a)−1,279	
	During the year	38,733	..	..	6,129	..	..	44,862	400	45,262	14,87,209
Lower Ganges canal ..	To end of previous year ..	3,04,60,364	63,20,983	20,00,812	3,12,326	9,620	79,899	3,91,84,004	28,61,823	4,20,45,827	8,19,37,076
	During the year	10,623	..	..	−6,898	..	..	3,725	106	3,831	13,06,661
Eastern Jumna canal ..	To end of previous year ..	41,23,816	8,65,662	66,192	32,910	..	6,01,898	56,90,478	3,47,610	60,38,088	1,22,18,610
	During the year	91,936	..	..	−7,714	..	..	84,222	954	85,176	2,06,518
Agra canal	To end of previous year ..	90,89,510	20,24,885	3,73,648	47,899	990	..	1,15,36,932	8,52,218	1,23,89,150	2,37,99,588
	During the year	..	..	..	−2,261	..	..	−2,261	..	−2,261	3,84,198
Sarda canal ..	To end of previous year ..	7,74,12,071	1,63,70,249	15,58,308	6,42,244	..	..	9,59,82,872	31,64,848	9,91,47,720	6,37,09,992
	During the year	4,27,321	86,557	3,273	9,606	..	..	5,26,757	12,119	5,38,876	45,22,301
Bijnor canals ..	To end of previous year ..	4,07,575	1,05,981	9,423	..	..	34,853	5,57,832	40,463	5,98,295	7,49,123
	During the year	−4,000	..	..	..	..	..	−4,000	..	−4,000	23,002
Ramganga canal ..	To end of previous year ..	19,10,478	5,45,144	82,727	..	..	..	25,38,349	19,725	25,58,074	11,86,695
			(a) +16					(a)+16		(a) +16	
	During the year	−4,404	..	..	..	..	..	−4,404	..	−4,404	1,21,777
State tube-wells ..	To end of previous year ..	1,18,11,144	13,70,690	1,21,928	3,02,887	..	..	1,36,06,149	1,30,107	1,37,36,256	12,13,591
		(a) −2,012	(a) +46,606	(a)−70	(a)−375			(a)+44,149		(a)+44,149	
	During the year	3,09,630	43,423	567	2,28,107	..	..	5,81,727	4,523	5,86,250	4,56,081
Tube-wells taken on lease.	To end of previous year ..	12,281	2,058	105	..	..	..	14,444	135	14,579	2,693
		(a) +1,714	(a) +338	(a)+70				(a)+2,122		(a)+2,122	
	During the year	..	..	..	..	..	..	..	..	..	534
Hydro-electric grid	To end of previous year ..	3,05,78,832	31,12,118	2,84,873	5,95,328	..	..	3,49,71,151	2,33,617	3,52,04,768	84,18,990
		(a) +1,950	(a)−92,368					(a)−90,418		(a)−90,418	
	During the year ..	8,24,838	91,519	5,137	18,260	..	..	9,39,754	10,028	9,49,782	13,73,875
Daurala sugarcane tramway.	To end of previous year ..	5,28,284	85,398	5,042	..	..	..	6,18,724	10,553	6,29,277	84,743
	During the year	−2,98,939	..	..	..	..	..	−2,98,939	..	−2,98,939	15,419
Fyzabad electricity and Gogra pumping scheme.	To end of previous year ..	17,21,742	4,59,786	24,553	188	..	..	22,06,269	48,792	22,55,061	1,13,064
	During the year	1,13,729	15,017	298	..	..	..	1,29,044	1,146	1,30,190	75,251
Total, Productive Works	To end of previous year ..	20,09,53,299	3,72,18,606	57,33,809	26,17,066	10,700	27,51,927	24,92,85,407	1,00,59,359	25,93,44,766	28,60,41,623
		(a) +375	(a)−45,410		(a)−375			(a)−45,410		(a)−45,410	
	During the year	15,09,467	2,36,516	9,275	2 45,229	..	..	20,00,487	29,276	20,29,763	99,72,826
UNPRODUCTIVE WORKS—A.—IRRIGATION WORKS											
Rohilkhand canals ..	To end of previous year ..	15,67,532	4,30,330	34,173	86,538	..	62,704	21,81,277	1,52,488	23,33,765	55,46,100
	During the year	..	..	..	−1,615	..	..	−1,615	..	−1,615	1,04,582
Dun canals ..	To end of previous year ..	15,10,214	3,28,299	17,553	8,778	..	7,43,137	26,07,981	73,192	26,81,173	36,88,834
	During the year	4,641	..	..	256	..	..	4,897	46	4,943	1,08,531
Betwa canal ..	To end of previous year ..	65,19,441	15,05,003	1,88,609	44,830	207	..	82,58,090	3,43,659	86,01,749	1,24,96,907
	During the year	11,520	..	..	1,083	..	..	12,603	347	12,950	2,76,214
Dhasan canal ..	To end of previous year ..	40,18,658	7,41,140	87,138	..	..	..	48,46,936	2,14,208	50,61,144	49,01,649
	During the year	..	..	..	..	..	..	..	..	..	1,63,698
Pahuj and Garhmau canals.	To end of previous year ..	6,67,664	1,43,243	5,818	..	..	..	8,16,725	20,070	8,36,795	8,05,307
	During the year	662	..	..	..	..	..	662	7	669	27,275
Barwar lake and canal	To end of previous year ..	5,16,328	2,00,085	34,439	..	..	..	7,50,852	27,787	7,78,639	6,88,683
	During the year	8,003	..	..	..	..	..	8,003	80	8,083	31,612
Siaori lake.. ..	To end of previous year ..	1,45,111	33,892	2,569	..	..	..	1,81,572	4,743	1,86,315	1,88,765
	During the year	..	..	..	..	..	..	..	..	..	6,736
Lakes and tanks in Jhansi district.	To end of previous year ..	1,71,837	25,132	1,566	..	..	..	1,98,535	11,293	2,09,828	3,08,214
	During the year	..	..	..	..	..	..	..	..	..	6,888
Carried over ..	To end of previous year ..	1,51,16,785	34,07,124	3,71,865	1,40,146	207	8,05,841	1,98,41,968	8,47,440	2,06,89,408	2,86,24,459
	During the year	24,826	..	..	−276	..	..	24,550	480	25,030	7,25,536

Capital Account of the Irrigation Works in the United Provinces for and to end of the year 1939-40—(concluded)

Irrigation works		Direct charges (net expenditure): Works	Establishment	Tools and plant	Suspense	Loss by exchange	Extraordinary replacements	Total	Indirect charges excluding interest	Total capital outlay excluding interest	Simple interest
		Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Brought forward ..	To end of previous year ..	1,51,16,785	34,07,124	3,71,865	1,40,146	207	8,05,841	1,98,41,968	8,47,440	2,06,89,408	2,86,24,459
	During the year	24,826	..	..	—276	..	..	24,550	480	25,030	7,25,536
Ken canal	To end of previous year ..	47,75,563	9,09,354	1,81,487	22,947	..	..	58,89,351	2,02,423	60,91,774	60,52,340
	During the year	22,518	..	..	—1,652	..	..	20,866	255	21,121	1,95,735
Majhgawan tank ..	To end of previous year ..	3,63 555	86,623	6,501	..	..	..	4,56,679	16,485	4,73,164	3,68,443
	During the year	..	..	..	..	..	..	..	..	..	15,884
Aunjhar tank ..	To end of previous year ..	3,01,348	1,50,679	8,258	..	..	..	4,60,285	12,189	4,72,474	3,18,819
	During the year	..	..	..	..	..	..	..	..	..	16,979
Raipura tank ..	To end of previous year ..	2,37,370	1,19,650	7,212	..	..	..	3,64,232	21,448	3,85,675	2,66,635
	During the year	..	..	..	..	..	..	..	..	..	12,956
Belasagar tank ..	To end of previous year ..	3,75,630	1,89,813	9,137	..	..	..	5,74,580	8,922	5,83,502	3,23,895
	During the year	..	..	..	..	..	..	..	..	..	20,112
Kamalpura tank ..	To end of previous year ..	2,20,529	1,04,925	5,154	..	..	..	3,30,608	4,033	3,34,641	1,84,587
	During the year	..	..	..	..	..	..	..	..	..	11,571
Jaiwanti tank ..	To end of previous year ..	6,27,546	3,26,392	19,192	..	..	..	9,73,130	34,592	10,07,722	7,26,534
	During the year	..	..	..	..	..	..	..	..	..	35,722
Tanks in Banda district	To end of previous year ..	4,07,070	1,09,812	6,433	..	..	..	5,28,315	22,913	5,46,228	4,55,730
	During the year	..	..	..	..	..	..	..	..	..	19,252
Lakes and tanks in Hamirpur district.	To end of previous year ..	1,06,854	45,937	2,389	..	..	..	1,55,180	6,916	1,62,096	1,58,022
	During the year	..	..	..	..	..	..	..	..	..	7,520
Ghagar canal including Garai canal	To end of previous year ..	40,29,303	7,91,245	2,06,373	1,974	..	..	50,28,895	1,35,597	51,64,492	42,23,800
	During the year	15,655	..	..	374	..	..	16,029	157	16,186	1,82,260
Ghori canal ..	To end of previous year ..	3,10,828	73,380	25,719	..	..	..	4,09,927	11,291	4,21,218	3,67,829
	During the year	..	..	..	..	..	..	..	..	..	13,748
Sukhra canal ..	To end of previous year ..	1,71,127	46,696	5,641	..	..	..	2,23,464	6,887	2,30,351	1,99,710
	During the year	..	..	..	..	..	..	..	..	..	7,464
Kitham reservoir ..	To end of previous year ..	1,57,634	75,687	3,069	..	..	..	2,36,390	11,942	2,48,332	2,12,892
	During the year	57,456	..	..	..	..	..	57,456	575	58,031	9,862
Total, Unproductive Works.	To end of previous year ..	2,72,01,142	64,37,317	8,58,430	1,65,067	207	8,05,841	3,54,68,004	13,43,073	3,68,11,077	4,24,83,695
	During the year	1,20,455	..	..	—1,554	..	..	1,18,901	1,467	1,20,368	12,74,601
GRAND TOTAL ..	To end of previous year ..	22,81,54,441	4,36,55,923	65,92,239	27,82,133	10,907	35,57,768	28,47,53,411	1,14,02,432	29,61,55,843	32,85,25,318
		(a)+375	(a)—45,410		(a)—375			(a)—45,410		(a)—45,410	
	During the year	16,29,922	2,36,516	9,275	2,43,675	..	..	21,19,388	30,743	21,50,131	1,12,47,427

(a) Represent adjustment of the previous years' errors.

P. D. GHOSH,
Assistant Accounts Officer.

I-C

Statement showing the Financial Results of Irrigation Works in the United Provinces for the year ending March 31, 1940

Canals	Irrigation actual receipts							
	Occupiers' rate	Owners' rate	Total	Plantation	Water power	Navigation	Miscellaneous	Total
1	2	3	4	5	6	7	8	9
A.—IRRIGATION WORKS.								
(1) PRODUCTIVE WORKS	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Upper Ganges canal ..	67,50,795	46,277	67,97,072	41,882	48,975	6,019	80,077	69,74,025
Lower Ganges canal ..	37,60,734	13,117	37,73,851	33,217	3,509	3,529	1,79,584	39,93,690
Eastern Jumna canal ..	23,87,020	6,750	23,93,770	23,428	12,548	..	21,246	24,50,992
Agra canal	14,23,503	3,320	14,26,823	22,902	1,401	..	35,843	14,86,969
Sarda canal	41,35,497	3,663	41,39,160	3,502	..	..	90,731	42,33,393
Bijnor canals.. ..	72,303	758	73,061	..	84	..	1,991	75,136
Ramganga canal ..	1,48,368	..	1,48,368	..	..	..	3,917	1,52,285
State tube-wells ..	37,55.166	..	37,55,166	..	..	..	45,012	38,00,178
Tube-wells taken on lease	10,922	..	10,922	..	..	..	35	10,957
Hydro-electric grid ..	..	..	..	..	..	..	39,01,034	39,01,034
Daurala sugarcane tramway.	..	..	..	..	..	..	80,713	80,713
Fyzabad electricity and Gogra pumping scheme.	53,511	..	53,511	..	..	..	33,254	86,765
Total, (1) Productive Works	2,24,97,819	73,885	2,25,71,704	1,24,931	66,517	9,548	44,73,437	2,72,46,137
(2) UNPRODUCTIVE WORKS								
Rohilkhand canals ..	1,12,509	8	1,12,517	..	1,064	..	10,272	1,23,853
Dun canals	1,32,578	5,064	1,37,642	..	8,750	..	26,427	1,72,819
Betwa canal	5,73,180	..	5,73,180	5,748	..	..	7,019	5,85,947
Dhasan canal ..	1,66,285	..	1,66,285	..	..	..	2,932	1,69,217
Pahuj and Garhmau canals	24,175	..	24,175	..	..	..	8,483	32,658
Barwar lake and canal ..	8,029	..	8,029	..	..	..	..	8,029
Siaori lake	7,512	..	7,512	..	..	..	..	7,512
Lakes and tanks in Jhansi district.	16,556	..	16,556	..	..	..	1,688	18,244
Ken canal	3,43,042	..	3,43,042	..	..	..	7,712	3,50,754
Majhgawan tank ..	14,293	..	14,293	..	..	..	1,768	16,061
Aunjhar tank ..	2,274	..	2,274	..	..	..	36	2,310
Raipura tank ..	1,466	..	1,466	..	..	..	625	2,091
Belasagar tank ..	10,975	..	10,975	..	..	..	133	11,108
Kamalpura tank ..	2,148	..	2,148	..	..	..	293	2,441
Jaiwanti tank ..	346	..	346	..	..	..	445	791
Tanks in Banda district ..	5,483	..	5,483	..	..	..	485	5,968
Lakes and tanks in Hamirpur district.	6,952	..	6,952	..	..	..	873	7,825
Ghagar canal including Garai canal.	1,76,307	..	1,76,307	..	..	..	7,095	1,83,402
Ghori canal ..	1,202	..	1,202	..	..	..	94	1,296
Sukhra canal	1,602	..	1,602	..	..	..	56	1,658
Kitham reservoir ..	..	..	..	..	..	..	1,691	1,691
Total, (2) Unproductive Works.	16,06,914	5,072	16,11,986	5,748	9,814	..	78,127	17,05,675
GRAND TOTAL ..	2,41,04,733	78,957	2,41,83,690	1,30,679	76,331	9,548	45,51,564	2,89,51,812

Statement showing the Financial Results of Irrigation Works in the

Canals	Irrigation actual receipts				Revenue management				Working
	Refunds of revenue	Total, net revenue	Share of land revenue	Total, gross revenue	Direction	Executive	Navigation	Civil officers	Total, revenue management
	10	11	12	13	14	15	16	17	18
A.—IRRIGATION WORKS									
(1) PRODUCTIVE WORKS	Rs.	Rs.	Rs.	Rs.		Rs.	Rs.	Rs.	Rs.
Upper Ganges canal ..	4,121	69,69,904	14,88,289	84,58,193		7,44,385	793	63,773	8,08,951
Lower Ganges canal ..	3,130	39,90,560	7,60,872	47,51,432		6,33,249	1,161	25,144	6,59,554
Eastern Jumna canal ..	2,320	24,48,672	3,50,377	27,99,049		2,59,010	..	36,888	2,95,898
Agra canal	2,458	14,84,511	64,230	15,48,741		1,82,184	..	22,443	2,04,627
Sarda canal ..	53,001	41,80,392	19,436	41,99,828		8,14,577	..	19,183	8,33,760
Bijnor canals	21	75,115	14,984	90,099		7,378	..	719	8,097
Ramganga canal ..	493	1,51,792	..	1,51,792		21,956	..	21	21,977
State tube-wells ..	2,653	37,97,525	2,102	37,99,627		4,83,574	..	175	4,83,749
Tube-wells taken on lease	..	10,957	..	10,957		1,631	..	..	1,631
Hydro-electric grid ..	36	39,00,998	..	39,00,998		4,04,387	..	..	4,04,387
Daurala sugarcane tramway.	..	80,713	..	80,713		6,823	..	..	6,823
Fyzabad electricity and Gogra pumping scheme.	112	86,653	..	86,653		47,410	..	..	47,410
Total, (1) Productive Works.	68,345	2,71,77,792	27,00,290	2,98,78,082		36,06,564	1,954	1,68,346	37,76,864
(2) UNPRODUCTIVE WORKS									
Rohilkhand canals ..	..	1,23,853	59,370	1,83,223		34,688	..	..	34,688
Dun canals	2	1,72,817	24,980	1,97,797		22,831	..	3,026	25,857
Betwa canal	504	5,85,443	2,860	5,88,303		1,41,661	..	7,279	1,48,940
Dhasan canal ..	57	1,69,160	1,592	1,70,752		28,515	..	1,979	30,494
Pahuj and Garhmau canals	..	32,658	826	33,484		4,052	..	1,177	5,229
Barwar lake and canal ..	..	8,029	..	8,029		1,149	..	507	1,656
Siaori lake	..	7,512	..	7,512		830	..	248	1,078
Lakes and tanks in Jhansi district.	..	18,244	1,415	19,659		3,119	..	441	3,560
Ken canal	81	3,50,673	..	3,50,673		68,741	..	2,842	71,583
Majhgawan tank ..	..	16,061	..	16,061		1,821	..	66	1,887
Aunjhar tank ..	..	2,310	..	2,310		3,232	..	..	3,232
Raipura tank ..	..	2,091	..	2,091		772	..	3	775
Belasagar tank ..	..	11,108	..	11,108		1,996	..	31	2,027
Kamalpura tank ..	..	2,441	..	2,441		639	..	6	645
Jaiwanti tank ..	..	791	..	791		384	..	..	384
Tanks in Banda district ..	..	5,968	..	5,968		1,958	..	..	1,958
Lakes and tanks in Hamirpur district.	..	7,825	1,763	9,588		1,965	..	21	1,986
Ghagar canal including Garai canal.	229	1,83,173	..	1,83,173		30,768	..	746	31,514
Ghori canal	..	1,296	..	1,296		1,189	..	..	1,189
Sukhra canal	..	1,658	..	1,658		683	..	6	689
Kitham reservoir ..	..	1,691	..	1,691		855	..	..	855
Total, (2) Unproductive Works.	873	17,04,302	92,806	17,97,608		3,51,848	..	18,378	3,70,226
GRAND TOTAL ..	69,218	2,88,82,594	27,93,096	3,16,75,690		39,58,412	1,954	1,86,724	41,47,090

United Provinces for the year ending March 31, 1940—(concluded)

expenses											
	Maintenance of work										
Establishment	Works	Repairs	Tools and plant	Plantation	Sundries for depreciation	Total, maintenance	Total, direct charges	Total, indirect charges	Grand total, working expenses	Net revenue	Revenue excluding land revenue
19	20	21	22	23	24	25	26	27	28	29	30
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
3,48,441	34,818	6,79,257	14,208	25,237	..	11,01,961	19,10,912	7,394	19,18,306	65,39,887	50,51,598
2,99,356	2,697	4,23,447	9,611	1,734	..	7,36,845	13,96,399	4,279	14,00,678	33,50,754	25,89,882
1,05,190	246	1,56,033	3,980	5,591	..	2,71,040	5,66,938	1,619	5,68,557	22,30,492	18,80,115
86,065	1,141	1,27,593	3,251	3,103	..	2,21,153	4,25,780	1,318	4,27,098	11,21,643	10,57,413
4,32,991	33,476	6,48,707	23,209	6,588	..	11,44,971	19,78,731	6,888	19,85,619	22,14,209	21,94,773
5,507	435	12,432	143	..	..	18,517	26,614	129	26,743	63,356	48,372
15,108	1,231	85,047	411	..	..	1,01,797	1,23,774	863	1,24,637	27,155	27,155
3,54,197	10,341	17,77,557	9,156	..	1,41,886	22,93,137	27,76,886	7,879	27,84,765	10,14,862	10,12,760
1,173	..	7,568	33	..	..	8,774	10,405	76	10,481	476	476
1,97,822	4,067	3,41,687	21,980	..	7,98,341	13,63,897	17,68,284	3,458	17,71,742	21,29,256	21,29,256
6,339	..	19,747	165	..	26,749	53,000	59,823	197	60,020	20,693	20,693
46,271	..	65,548	1,371	..	..	1,13,190	1,60,600	655	1,61,255	—74,602	—74,602
18,98,460	88,452	43,44,623	87,518	42,253	9,66,976	74,28,282	1,12,05,146	34,755	1,12,39,901	1,86,38,181	1,59,37,891
20,462	1,385	34,051	1,457	..	..	57,355	92,043	354	92,397	90,826	31,456
22,316	..	34,322	845	..	..	57,484	83,341	343	83,684	1,14,113	89,133
57,871	2,619	73,395	971	660	..	1,35,016	2,83,956	767	2,84,723	3,03,580	3,00,720
28,123	80	37,518	476	..	..	66,197	96,691	376	97,067	73,685	72,093
3,940	246	5,022	66	..	..	9,274	14,503	53	14,556	18,928	18,102
1,102	..	1,474	19	..	..	2,595	4,251	15	4,266	3,763	3,763
803	..	1,074	14	..	..	1,891	2,969	11	2,980	4,532	4,532
3,066	103	3,996	51	..	..	7,216	10,776	41	10,817	8,842	7,427
37,947	2,208	47,366	643	1,160	..	89,324	1,60,907	507	1,61,414	1,89,259	1,89,259
1,796	..	2,400	30	..	..	4,226	6,113	24	6,137	9,924	9,924
3,229	..	4,317	59	..	..	7,605	10,837	43	10,880	—8,570	—8,570
770	..	1,030	13	..	..	1,813	2,588	10	2,598	—507	—507
1,977	..	2,642	33	..	..	4,652	6,679	26	6,705	4,403	4,403
635	..	850	10	..	..	1,495	2,140	9	2,149	292	292
384	..	514	7	..	..	905	1,289	5	1,294	—503	—503
1,952	..	2,609	33	..	..	4,594	6,552	26	6,578	—610	—610
1,952	..	2,610	33	..	..	4,595	6,581	26	6,607	2,981	1,218
29,764	5,988	33,589	504	216	..	70,061	1,01,575	398	1,01,973	81,200	81,200
1,188	..	1,589	20	..	..	2,797	3,986	16	4,002	—2,706	—2,706
680	..	910	11	..	..	1,601	2,290	9	2,299	—641	—641
856	..	1,144	14	..	..	2,014	2,869	11	2,880	—1,189	—1,189
2,20,313	12,629	2,92,423	5,309	2,036	..	5,32,710	9,02,936	3,070	9,06,006	8,91,602	7,98,796
21,18,773	1,01,081	46,37,046	92,827	44,289	9,66,976	79,60,992	1,21,08,082	37,825	1,21,45,907	1,95,29,783	1,67,36,687

P. D. GHOSH,

Assistant Accounts Officer.

Statement showing the financial results of irrigation,

Number of work	Name of work	General financial results to end of 1939-40: Mileage in operation: Main canal and branches	Mileage in operation: Distributaries	Estimated cost of construction (direct and indirect)	Date of completion of work (P. W. Code II, 1918)	Date when system first came into operation	Total capital outlay (direct and in-direct)	Accumulated arrears of interest	Accumulated surplus revenues	Total sum-at-charge (column 7 + column 8)
1	2	3	4	5	6a	6b	7	8	9	10
	A—IRRIGATION WORKS	Miles	Miles	Rs.	Date	Date	Rs.	Rs.	Rs.	Rs.
	(1) PRODUCTIVE WORKS									
1	Upper Ganges canal..	568	3,379	4,45,21,823	31-3-1891	1855-56	4,47,71,654	..	12,75,35,085	4,47,71,654
2	Lower Ganges canal..	662	3,159	4,17,44,230	31-3-1891	1879-80	4,20,49,658	..	4,06,24,851	4,20,49,658
3	Eastern Jumna canal	129	809	60,98,068	31-3-1891	Prior to 1830-31	61,23,264	..	7,59,44,718	61,23,264
4	Agra canal ..	100	900	1,24,41,251	31-3-1891	1874-75	1,23,86,889	..	59,96,533	1,23,86,889
5	Sarda canal ..	912	3,370	9,86,60,868	31-3-1930	1928-29	9,96,86,596	5,82,34,743	..	15,79,21,339
6	Bijnor canals ..	..	78	5,94,295	31-3-1894	Prior to 1886-87	5,94,295	..	9,96,382	5,94,295
7	Ramganga canal ..	..	101	25,53,686	31-3-1936	1930-31	25,53,686	21,63,133	..	47,16,819
8	State tube-wells ..	..	3	1,43,31,693	18-5-1934	1932-33	1,43,66,655	19,17,972	..	1,62,84,627
9	Tube-wells taken on lease.	..	..	16,695	..	1934-35	16,701	6,092	..	22,793
10	Hydro-electric grid ..	..	..	3,51,78,180	31-3-1939	1926-27	3,60,64,132	..	15,74,875	3,60,64,132
11	Daurala sugarcane tramway.	..	..	3,30,338	31-3-1938	1934-35	3,30,338	1,77,220	..	5,07,558
12	Fyzabad electricity and Gogra pumping scheme	..	120	17,01,320	20-5-1936	..	23,85,251	3,78,640	..	27,63,891
	Total, (1) Productive Works.	2,371	11,919	25,81,72,447	..	..	26,13,29,119	6,28,77,800	25,26,72,444	32,42,06,919
	(2) UNPRODUCTIVE WORKS									
1	Rohilkhand canals ..	..	278	22,47,227	31-3-1894	1893-94	23,32,150	16,36,701	..	39,68,851
2	Dun canals ..	..	91	26,77,082	31-3-1891	Prior to 1840-41	26,86,116	..	1,49,818	26,86,116
3	Betwa canal ..	157	615	85,74,221	31-3-1886	1886-87	86,14,699	1,04,52,666	..	1,90,67,365
4	Dhasan canal ..	107	186	50,61,144	31-3-1911	1911-12	50,61,144	66,15,558	..	1,16,76,702
5	Pahuj and Garhmau canals	..	67	8,41,766	31-3-1911	1911-12	8,37,464	9,07,857	..	17,45,321
6	Barwar lake and canal	..	22	7,97,191	31-3-1923	1922-23	7,86,722	8,13,473	..	16,00,195
7	Siaori lake ..	..	14	1,86,315	31-3-1912	1911-12	1,86,315	2,26,602	..	4,12,917
8	Lakes and tanks in Jhansi district	..	77	2,09,828	31-3-1894	1893-94	2,09,828	3,81,842	..	5,91,670
9	Ken canal ..	86	259	61,49,213	31-3-1909	1908-09	61,12,895	55,66,587	..	1,16,79,482
10	Majhgawan tank ..	..	30	4,73,164	31-3-1917	1915-16	4,73,164	3,44,836	..	8,18,000
11	Aunjhar tank ..	..	7	4,72,474	31-3-1924	..	4,72,474	3,58,049	..	8,30,523
12	Raipura tank ..	..	10	3,85,675	16-10-1931	..	3,85,675	3,01,705	..	6,87,380
13	Belasagar tank ..	..	38	5,83,502	31-3-1930	1929-30	5,83,502	3,57,759	..	9,41,261
14	Kamalpura tank ..	..	6	3,34,641	31-3-1930	1929-30	3,34,641	2,12,150	..	5,46,791
15	Jaiwanti tank ..	..	12	10,07,722	31-3-1930	1929-30	10,07,722	8,14,820	..	18,22,542
16	Tanks in Banda district	..	22	5,46,228	31-3-1915	1914-15	5,46,228	5,47,961	..	10,94,189
17	Lakes and tanks in Hamirpur district	..	21	1,62,096	31-3-1894	1893-94	1,62,096	2,27,471	..	3,89,567
18	Ghagar canal including Garai canal.	67	170	51,78,330	31-3-1918	1916-17	51,80,678	42,22,112	..	94,02,790
19	Ghori canal ..	..	11	4,21,218	30-11-1915	1915-16	4,21,218	5,94,524	..	10,15,742
20	Sukhra canal ..	..	7	2,30,351	31-3-1915	1914-15	2,30,351	2,58,675	..	4,89,026
21	Kitham reservoir ..	..	..	3,19,972	31-3-1921	1921-22	3,06,363	2,53,007	..	5,59,370
	Total, (2) Unproductive Works.	417	1,943	3,68,59,360	..	..	3,69,31,445	3,50,94,355	1,49,813	7,20,25,800

NOTE—The figures in column 16 represent aggregate amount of interest calculated at the following rates;

(1) On the outlay to end of 1916-17 at 3·3252 per cent.
(2) Ditto from 1917-18 to 1920-21 at 5·1979 per cent.
(3) Ditto for 1921-22 and 1922-23 at 5 per cent.
(4) Ditto 1923-24 at 5·25 per cent.
(5) Ditto 1924-25 at 5 per cent.
(6) Ditto 1925-26 at 5·25 per cent.
(7) Ditto 1926-27 at 5 per cent.
(8) Ditto 1927-28 at 3·75 per cent.
(9) Ditto 1928-29 at 4·25 per cent.

navigation, embankment and drainage works based on actual receipts for and up to the end of 1939–40

Financial results of the year 1939-40

Gross receipts (direct and indirect)	Working expenses (direct and indirect)	Net revenue	Percentage on capital outlay, column 7	Percentage on sum-at-charge, column 10	Interest at* per cent. on direct capital outlay to end of previous year, plus half the outlay of the year	Net profit	Net loss	Area irrigated	Percentage of working expenses to receipts (column 11 to column 12)
11	12	13	14	15	16	17	18	19	20
Rs.	Rs.	Rs.	Per cent.	Per cent.	Rs.	Rs.	Rs.	Acres	Per cent.
84,58,193	19,18,306	65,39,887	14·61	14·61	14,87,209	50,52,678	..	1,497,408	22·68
47,51,432	14,00,678	33,50,754	7·97	7·97	13,06,661	20,44,093	..	896,241	29·48
27,99,049	5,68,557	22,30,492	36·43	36·43	2,06,518	20,23,974	..	413,474	20·31
15,48,741	4,27,098	11,21,643	9·06	9·06	3,84,198	7,37,445	..	365,620	27·58
41,99,828	19,85,619	22,14,209	2·22	1·40	45,22,301	..	23,08,092	912,106	47·28
90,099	26,743	63,356	10·66	10·66	23,002	40,354	..	25,251	29·68
1,51,792	1,24,637	27,155	1·06	0·58	1,21,777	..	94,622	20,663	82·11
37,99,627	27,84,765	10,14,862	7·06	6·23	4,56,081	5,58,781	..	589,410	73·29
10,957	10,481	476	2·85	2·09	534	..	58	2,095	95·65
39,00,998	17,71,742	21,29,256	5·90	5·90	13,73,875	7,55,381	..	..	45·42
80,713	60,020	20,693	6·26	4·08	15,419	5,274	..	..	74·36
86,653	1,61,255	—74,602	—3·13	—2·70	75,251	..	1,49,853	15,387	186·09
2,98,78,082	1,12,39,901	1,86,38,181	7·13	5·75	99,72,826	1,12,17,980	25,52,625	4,737,655	37·62
1,83,223	92,397	90,826	3·89	2·29	1,04,582	..	13,756	52,932	50·43
1,97,797	83,684	1,14,113	4·25	4·25	1,08,531	5,582	..	20,365	42·31
5,88,303	2,84,723	3,03,580	3·52	1·59	2,76,214	27,366	..	162,510	48·40
1,70,752	97,067	73,685	1·46	0·63	1,63,698	..	90,013	59,252	56·85
33,484	14,556	18,928	2·26	1·08	27,275	..	8,347	7,396	43·47
8,029	4,266	3,763	0·48	0·24	31,612	..	27,849	3,555	53·13
7,512	2,980	4,532	2·43	1·10	6,736	..	2,204	2,150	39·67
19,659	10,817	8,842	4·21	1·49	6,888	1,954	..	3,978 *1,311	55·02
3,50,673	1,61,414	1,89,259	3·09	1·62	1,95,735	..	6,476	109,381	46·03
16,061	6,137	9,924	2·09	—1·21	15,884	..	5,960	4,988	38·21
2,310	10,880	—8,570	1·81	—1·03	16,979	..	25,549	932	470·99
2,091	2,598	—507	—0·13	—0·07	12,956	..	13,463	639	124·25
11,108	6,705	4,403	0·75	0·47	20,112	..	15,709	4,127	60·36
2,441	2,149	292	0·09	0·05	11,571	..	11,279	512	88·04
791	1,294	—503	—0·05	—0·08	35,722	..	36,225	620	163·60
5,968	6,578	—610	—0·11	—0·06	19,252	..	19,862	2,924	110·22
9,588	6,607	2,981	1·84	0·77	7,520	..	4,539	2,226	68·91
1,83,173	1,01,973	81,200	1·56	0·86	1,82,260	..	1,01,060	50,466	55·67
1,296	4,002	—2,706	—0·64	—0·27	13,748	..	16,454	494	308·80
1,658	2,299	—641	—0·28	—0·13	7,464	..	8,105	504	138·66
1,691	2,880	—1,189	—0·39	—0·21	9,862	..	11,051	..	170·31
17,97,608	9,06,006	8,91,602	2·41	1·24	12,74,601	34,902	4,17,901	489,951 *1,311	50·40

(10) On the outlay for 1929-30 and 1930-31 at 5 per cent.
(11) Ditto 1931-32 at 4·25 per cent.
(12) Ditto 1932-33 at 5·5 per cent.
(13) Ditto 1933-34 at 4·5 per cent.
(14) Ditto 1934-35 at 3·5 per cent.
(15) Ditto 1935-36 at 3·25 per cent.
(16) Ditto 1936-37 at 3 per cent.
(17) Ditto 1937-38 at 3·5 per cent.
(18) Ditto 1938-39 at 3·5 per cent.
(19) On the half outlay for 1939-40 at 3·5 per cent.
(20) On the outlay met from revenue to end of 1938-39 plus half the outlay for 1939-40 at 3·5 per cent.

* The figures in block type denote free irrigation.

A. L. SAKSENA,
Assistant Accountant General.

Demands and realizations in the United Provinces during the year 1939–40

Irrigation works	Balance of demand unrealized at the commencement of the year	Demand of the year	Total	Deduct remissions not including cash refunds	Net total	Deduct amount unrealized at the close of the year	Actual receipts of the year
1	2	3	4	5	6	7	8
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
XVII-A—IRRIGATION WORKS							
(1) PRODUCTIVE WORKS							
Upper Ganges canal	14,340	69,75,995	69,90,335	10,564	69,79,771	5,746	69,74,025
Lower Ganges canal	9,318	39,99,491	40,08,809	11,604	39,97,205	3,515	39,93,690
Eastern Jumna canal	4,679	24,56,414	24,61,093	8,468	24,52,625	1,633	24,50,992
Agra canal	43,982	15,15,013	15,58,995	6,815	15,52,180	65,184	14,86,996
Sarda canal	1,07,793	42,21,686	43,29,479	20,558	43,08,921	75,528	42,33,393
Bijnor canals	44	75,249	75,293	113	75,180	44	75,136
Ramganga canal	143	1,52,334	1,52,477	36	1,52,441	156	1,52,285
State tube-wells	21,429	37,98,820	38,20,249	11,283	38,08,966	8,788	38,00,178
Leased tube-wells	31	10,936	10,967	10	10,957	..	10,957
Hydro-electric grid	9,10,628	38,24,816	47,35,444	22,040	47,13,404	8,12,370	39,01,034
Daurala sugarcane tramway	49,219	37,042	86,261	..	86,261	5,548	80,713
Fyzabad electricity and Gogra pumping scheme	..	86,765	86,765	..	86,765	..	86,765
Total, (1) Productive Works	11,61,606	2,71,54,561	2,83,16,167	91,491	2,82,24,676	9,78,512	2,72,46,164
(2) UNPRODUCTIVE WORKS							
Rohilkhand canals	321	1,23,929	1,24,250	117	1,24,133	280	1,23,853
Dun canals	475	1,72,778	1,73,253	132	1,73,121	302	1,72,819
Betwa canal	308	5,86,428	5,86,736	776	5,85,960	13	5,85,947
Dhasan canal	677	1,69,092	1,69,769	552	1,69,217	..	1,69,217
Pahuj and Garhmau canals	..	32,703	32,703	32	32,671	13	32,658
Barwar lake and canal	..	8,029	8,029	..	8,029	..	8,029
Siaori lake	..	7,602	7,602	90	7,512	..	7,512
Lakes and tanks in Jhansi district	..	18,301	18,301	24	18,277	33	18,244
Ken canal	764	3,51,005	3,51,769	1,012	3,50,757	3	3,50,754
Majhgawan tank	..	16,061	16,061	..	16,061	..	16,061
Aunjhar tank	..	2,312	2,312	2	2,310	..	2,310
Raipura tank	..	2,108	2,108	17	2,091	..	2,091
Belasagar tank	..	11,228	11,228	60	11,168	60	11,108
Kamalpura tank	384	2,818	3,202	761	2,441	..	2,441
Jaiwanti tank	..	791	791	..	791	..	791
Tanks in Banda district	..	6,034	6,034	30	6,004	36	5,968
Lakes and tanks in Hamirpur district	..	7,838	7,838	7	7,831	6	7,825
Ghagar canal including Garai canal	3,696	1,81,593	1,85,289	838	1,84,451	1,049	1,83,402
Ghori canal	..	1,302	1,302	4	1,298	2	1,296
Sukhra canal	..	1,660	1,660	2	1,658	..	1,658
Kitham reservoir	..	1,691	1,691	..	1,691	..	1,691
Total, (2) Unproductive Works	6,625	17,05,303	17,11,928	4,456	17,07,472	1,797	17,05,675
WORKS FOR WHICH NEITHER CAPITAL NOR REVENUE ACCOUNTS ARE KEPT							
Lakes and tanks	..	7,656	7,656	211	7,445	133	7,312
Total, Lakes and tanks	..	7,656	7,656	211	7,445	133	7,312
GRAND TOTAL	11,68,231	2,88,67,520	3,00,35,751	96,158	2,99,39,593	9,80,442	2,89,59,151

P. D. GHOSH,
Assistant Accounts Officer.

Statement showing financial results of the Irrigation Works in the United Provinces for the year 1939-40

Canal projects	Capital outlay direct and indirect to end of the year	Revenue assessed during the year: Direct assessed revenue: Occupiers' rate	Owners' rate	Plantation	Water power	Navigation	Miscellaneous	Total	Indirect revenue due to operation of canals	Grand total	Working expenses direct and indirect of the year	Net assessed revenue of the year	Percentage on capital outlay to the end of the year
1	2	3	4	5	6	7	8	9	10	11	12	13	14
	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
A—IRRIGATION WORKS													
(1) PRODUCTIVE WORKS													
Upper Ganges canal	4,47,71,654	67,74,906	42,808	58,988	48,865	6,019	55,849	69,87,435	14,88,289	84,75,724	19,18,306	65,57,418	14·65
Lower Ganges canal	4,20,49,658	36,12,627	12,098	58,414	3,515	3,529	1,53,568	38,43,751	7,60,872	46,04,623	14,00,678	32,03,945	7·62
Eastern Jumna canal	61,23,264	21,09,174	7,764	30,714	12,627	..	12,964	21,73,243	3,50,377	25,23,620	5,68,557	19,55,063	31·93
Agra canal	1,23,86,889	13,62,886	3,011	29,405	1,567	..	29,329	14,26,198	64,230	14,90,428	4,27,098	10,63,330	8·58
Sarda canal	9,96,86,596	42,37,388	2,666	32,401	1,155	..	56,507	43,30,117	19,436	43,49,553	19,85,619	23,63,934	2·37
Bijnor canals	5,94,295	71,240	710	1,477	84	..	612	74,123	14,984	89,107	26,743	62,364	10·49
Ramganga canal	25,53,686	1,59,419	..	396	..	..	3,093	1,62,908	..	1,62,908	1,24,637	38,271	1·50
State tube-wells	1,43,66,655	31,12,022	..	57	..	..	35,801	31,47,380	2,102	31,49,982	27,84,765	3,65,217	2·54
Tube-wells taken on lease	16,701	11,503	..	..	..	..	17	11,520	..	11,520	10,481	1,039	6·22
Hydro-electric grid	3,60,64,132	..	..	..	..	..	38,20,806	38,20,806	..	38,20,806	17,71,742	20,49,064	5·68
Daurala sugarcane tramway	3,30,338	..	..	..	..	..	37,042	37,042	..	37,042	60,020	−22,978	−6·96
Fyzabad electricity and Gogra pumping scheme	23,85,251	59,824	..	292	..	..	33,710	93,826	..	93,826	1,61,255	−67,429	−2·83
Total, (1) Productive Works ..	26,13,29,119	2,15,10,989	69,057	2,12,144	67,813	9,548	42,39,298	2,61,08,849	27,00,290	2,88,09,139	1,12,39,901	1,75,69,238	6·72
(2) UNPRODUCTIVE WORKS													
Rohilkhand canals	23,32,150	1,09,585	865	6,899	1,064	..	4,017	1,21,930	59,370	1,81,300	92,397	88,903	3·81
Dun canals	26,86,116	1,32,866	4,972	619	8,972	..	25,704	1,73,133	24,980	1,98,113	83,684	1,14,429	4·26
Betwa canal	86,14,699	6,10,674	..	6,903	..	..	5,747	6,23,324	2,860	6,26,184	2,84,723	3,41,461	3·96
Dhasan canal	50,61,144	1,70,066	..	1,916	..	..	505	1,72,487	1,592	1,74,079	97,067	77,012	1·52
Pahuj and Garhmau canals	8,37,464	20,734	..	1,325	..	..	7,170	29,229	826	30,055	14,556	15,499	1·85
Barwar lake and canal	7,86,722	9,904	..	111	..	..	55	10,070	..	10,070	4,266	5,804	0·74
Siaori lake	1,86,315	5,464	..	130	..	..	5	5,599	..	5,599	2,980	2,619	1·41
Lakes and tanks in Jhansi district	2,09,828	10,766	..	370	..	..	1,050	12,186	1,415	13,601	10,817	2,784	1·33
Ken canal	61,12,895	3,43,134	..	3,391	..	..	4,248	3,50,773	..	3,50,773	1,61,414	1,89,359	3·10
Majhgawan tank	4,73,164	15,030	..	216	..	..	1,553	16,799	..	16,799	6,137	10,662	2·26
Aunjhar tank	4,72,474	2,695	..	36	..	..	..	2,731	..	2,731	10,880	−8,149	−1·72
Raipura tank	3,85,675	2,060	..	115	..	..	510	2,685	..	2,685	2,598	87	0·02
Belasagar tank	5,83,502	11,641	..	125	..	..	11	11,777	..	11,777	6,705	5,072	0·87
Kamalpura tank	3,34,641	1,940	..	188	..	..	468	2,596	..	2,596	2,149	447	0·13
Jaiwanti tank	10,07,722	1,631	..	29	..	..	416	2,076	..	2,076	1,294	782	0·08
Tanks in Banda district	5,46,228	8,695	..	70	..	..	454	9,219	..	9,219	6,578	2,641	0·48
Lakes and tanks in Hamirpur district ..	1,62,096	6,624	..	399	..	..	480	7,503	1,763	9,266	6,607	2,659	1·64
Ghagar canal including Garai canal	51,80,678	1,77,355	370	1,238	..	..	5,998	1,84,961	..	1,84,961	1,01,973	82,988	1·60
Ghori canal	4,21,218	1,567	..	62	..	..	33	1,662	..	1,662	4,002	−2,340	−0·56
Sukhra canal	2,30,351	1,781	..	31	..	..	25	1,837	..	1,837	2,299	−462	−0·20
Kitham reservoir	3,06,363	..		569	..	..	1,123	1,692	..	1,692	2,880	−1,188	−0·89
Total, (2) Unproductive Works ..	3,69,31,445	16,44,212	6,207	24,242	10,036	..	59,572	17,44,269	92,806	18,37,075	9,06,006	9,31,069	2·52
GRAND TOTAL ..	29,82,60,564	2,31,55,201	75,264	2,36,386	77,849	9,548	42,98,870	2,78,53,118	27,93,096	3,06,46,214	1,21,45,907	1,85,00,307	6·20

P. D. GHOSH,
Assistant Accounts Officer.

I-D

Statement of traffic on canals in the United Provinces during the year 1939–40

			Ganges canal
Length of channel open for navigation	Upper .. 213; Lower .. 123	Miles.	336
Receipts—Tollage on private boats		Rs.	4,580
Hire of Government boats	Cargo boats 319; Row boats 54	,,	373
Tollage on rafts		,,	1,541
Carrying operations on transport services—Government boats..		,,	..
Fines, sundries, etc.		,,	3,053
Total, Receipts ..		,,	9,547
Maintenance charges, including Navigation establishment		,,	5,723
Net revenue of the year ..		,,	3,824
Total number of boats plying for cargo		No.	57
Ditto passengers ..	Roorkee College	,,	18
Total registered tonnage of cargo		Tons	24,021
Ditto number of passengers		No.	..
Ton mileage, up		Tons	52,710
Ditto down		,,	1,633,271
Total ..		,,	1,685,981
Estimated value of cargo, up		Rs.	49,681
Ditto down		,,	5,17,032
Total ..		,,	5,66,713
Rafts feet × feet × feet, up		C.ft.	..
Ditto down		,,	498,487
Total ..		,,	498,487
Estimated value of rafts, total		Rs.	1,08,650
Tollage on boats per ton per mile		Pies	0·52
Ditto rafts per 100 cubic feet		Annas	4·94

II-D

Description and quantities of goods, etc. carried on canals in the United Provinces during the year 1939–40

Description	Ganges canal					
	Total				Private	
	Quantity in tons			Value	Quantity	Value
	Up	Down	Total	Rs.	Tons	Rs.
Grain	1	2,613	2,614	1,99,673	2,614	1,99,673
Cotton	14	2	16	9,772	16	9,772
Oilseeds	35	469	504	78,793	504	78,798
Salt	55	..	55	3,352	55	3,352
Piece-goods	12	12	24	1,541	24	1,541
Metals	13	..	13	4,934	13	4,934
Building materials	817	251	1,068	5,803	343	3,778
Miscellaneous	41	5,531	5,572	30,051	5,572	30,051
Fuel	430	7,904	8,334	1,08,625	7,391	98,558
Timber	7	3,104	3,111	84,206	3,111	84,206
Bamboos, etc.	60	2,191	2,251	27,265	2,251	27,265
Colours	3	456	459	12,688	459	12,688
Total ..	1,488	22,533	24,021	5,66,713	22,353	5,54,616

Statement of areas irrigated by Irrigation Works in the United Provinces during the year 1939–40

Name of canal	Number of running days		Areas irrigated in acres							Average discharge cubic feet per second				Acres irrigated per cubic foot per second			
								Double-cropped		At head		Utilized		Discharge at head		Utilized	
	Kharif	*Rabi*	*Kharif*	*Rabi*	Total	Flow	Lift	Area irrigated	Percentage of total area	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi* with sugar-cane	*Kharif*	*Rabi* with sugarcane
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
	Days	Days	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Cusecs	Cusecs	Cusecs	Cusecs	Acres	Acres	Acres	Acres
Upper Ganges canal ..	172	158	672,834	824,574	1,497,408	1,225,879	271,529	292,710	19·55	(*a*)5,139	(*a*)4,138	3,740	3,278	131	260	185	328
Lower Ganges canal ..	141	157	281,493	614,748	896,241	619,430	276,811	124,879	13·93	(*b*)3,950	(*b*)3,636	2,501	2,445	71	183	113	273
Eastern Jumna canal ..	177	166	216,066	197,408	413,474	353,072	60,402	65,168	15·76	1,991	1,158	1,674	1,009	109	229	129	263
Agra canal	152	132	160,700	204,920	365,620	291,308	74,312	24,826	6·79	(*c*)1,184	(*c*)1,108	944	1,006	136	203	170	223
Sarda canal	136	162	347,487	564,619	912,106	647,991	264,115	30,841	3·38	7,363	5,000	4,499	3,311	47	151	77	227
Bijnor canals . ..	155	142	16,703	8,548	25,251	23,483	1,768	1,415	5·60	68·8	84·9	63·1	86·6	243	198	265	198
Ramganga canal ..	74	98	7,027	13,636	20,663	18,208	2,455	..	..	100	108	100	108	70	187	70	187
Gogra canal	78	90	4,035	11,352	15,387	10,473	4,914	..	..	125	131	125	131	32	86	32	86
Agricultural tube-well canal (State tube-wells) ..	55·9	56	251	674	925	897	28	..	..	4·94	4·94	4·94	4·94	51	186	51	186
State tube-wells ..	..	..	155,352	433,133	588,485	588,427	58	20,275	3·45	1,884·8	1,792·8	1,804·8	1,792·8	86	251	86	251
Private tube-wells taken on lease by Government ..	..	..	546	1,549	2,095	2,095	..	24	1·15	7·42	7·42	7·42	7·42	74	246	74	246
Rohilkhand canals (proper)	163	93	38,039	14,893	52,932	48,148	4,784	2,155	4·06	319	273	311	261	119	92	122	96
Dun canals	183	183	11,183	9,182	20,365	20,353	12	4,331	21·27	263	231	263	231	43	51	43	51
Betwa canal	35	117	3,324	159,186	162,510	154,981	7,529	..	..	508	936	503	920	6·5	173	6·6	176
Dhasan canal	29	128	3,042	56,210	59,252	58,766	486	..	..	155	475	155	475	19·6	124	19·6	124
Pahuj canal	5	66	62	3,323	3,385	3,278	107	..	..	6·6	71·5	6·6	58·3	9·4	46	9·4	57
Garhmau canal.. ..	22	81	281	3,730	4,011	3,886	125	..	..	13·5	42·4	13·5	42·4	20·8	88	20·8	88
Barwar lake and canal ..	26	95	15	3,540	3,555	3,555	..	..	..	20	33·1	20	33·1	0·75	107	0·75	107
Siaori lake	14	86	16	2,134	2,150	1,955	195	..	..	11	18·2	11	18·2	1·5	118	1·5	118
Lakes and tanks, Jhansi district	..	..	252 *401*	3,726 *910*	3,978 *1,311*	3,944 *1,309*	34 2	..	..	..	..	..	..	..	..	..	..
Ken canal	110	77	35,656	73,725	109,381	107,006	2,375	7,470	6·8	706	879	675	864	50·5	86	53	86
Majhgawan tank ..	44	77	680	4,308	4,988	4,942	46	..	..	39·77	49·58	39·77	49·58	17·1	100	17·1	100
Aunjhar tank	10	51	29	903	932	918	14	..	..	4·5	9·2	4·5	9·2	6·4	100	6·4	100
Raipura tank	24	81	143	496	639	637	2	..	..	4·8	8·7	4·8	8·7	30	73	30	73
Belasagar tank ..	29	104	382	3,745	4,127	4,046	81	..	..	6·83	27·93	6·83	27·93	56·1	146	56·1	146
Kamalpura tank ..	21	31	231	281	512	511	1	..	..	7·0	7·4	7·0	7·4	33	69	33	69
Jaiwanti tank	..	71	..	620	620	619	1	..	..	..	10·8	..	10·8	..	56	..	56
Tanks in Banda district ..	..	..	62	2,862	2,924	2,906	18	..	..	..	..	..	..	..	..	..	..
Lakes and tanks, Hamirpur district	39	61	232	1,994	2,226	2,186	40	..	..	7·1	34·6	7·1	34·6	32·7	63·2	32·5	63·2

N.B.—(*a*) Exclusive of volume passed on to—

	Average discharge *Kharif*	*Rabi*
(1) Lower Ganges canal by Aligarh division, Ganges canal	470	994
(2) Agra canal through Jani escape, Meerut division, Ganges canal	349	368
Total ..	819	1,362

(*b*) Inclusive of volume passed on by Aligarh division, Ganges canal.
(*c*) Ditto ditto Meerut division, Ganges canal.

NOTE – Figures in italics denote free irrigation.

Statement of areas irrigated by Irrigation Works in the United Provinces during the year 1939–40—(concluded)

Name of canal	Number of running days		Areas irrigated in acres					Double-cropped		Average discharge cubic feet per second				Acres irrigated per cubic foot per second			
										At head		Utilized		Discharge at head		Utilized	
	Kharif	*Rabi*	*Kharif*	*Rabi*	Total	Flow	Lift	Area irrigated	Percentage of total area	*Kharif*	*Rabi*	*Kharif*	*Rabi*	*Kharif*	*Rabi* with sugar-cane	*Kharif*	*Rabi* with sugar-cane
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Ghagar canal system	Days	Days	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Cusecs	Cusecs	Cusecs	Cusecs	Acres	Acres	Acres	Acres
Karamnasa canal	55	..	4,635	..	4,635	4,633	2	..	..	104	..	104	..	45	..	45	..
Ghagar canal	126	51	11,382	4,102	15,484	15,395	89	85	0·55	317	304	211	174	36	15	54	26
Garai canal	161	62	26,150	4,197	30,347	27,320	3,027	202	0·66	249	94	249	94	105	99	105	99
Total, Ghagar canal system	..	..	42,167	8,299	50,466	47,348	3,118	287	0·57	..	..	..	..	..	..	..	..
Ghori canal	39	52	114	380	494	480	14	1	0·20	29	25	29	25	4	19	4	19
Sukhra canal	43	60	162	342	504	498	6	..	..	15	16	15	16	11	31	11	31
Works for which no capital and revenue accounts are kept.																	
Tanks and bunds, Betwa canal division ..	..	..	..	1,871	1,871	1,871	..										
Tanks, Jhansi division, Betwa canal.	..	..	157	1,397	1,554	888	666	..	..	..	..	..	..	..	..	..	..
			66	*85*	*151*	*149*	*2*	..	..	..	..	..	..	..	..	..	..
Jagnair tanks, Agra district (Lower division, Agra canal).	..	..	2	1,809	1,811	1,811	..	..	..	..	..	..	..	..	..	..	..
Tanks, Banda and Allahabad districts (Ken canal division).	..	..	2,105	3,326	5,431	5,409	22	..	..	..	..	..	..	..	..	..	..

N.B.—Figures in italics denote free irrigation.

Statement showing incidence of working expenses and assessed water revenue on canals in the United Provinces during 1939-40

Name of canal	Average discharge of the year at canal head in cubic feet per second	Water-rate assessed, 1939-40: Occupiers'	Water-rate assessed, 1939-40: Owners'	Water-rate assessed, 1939-40: Total: Direct	Water-rate assessed, 1939-40: Total: Indirect	Total of Direct and Indirect	Gross assessed revenue from all sources	Working expenses, Direct and Indirect	Acres irrigated during 1939-40	Working expenses: Percentage on gross revenue	Working expenses: Per acre irrigated	Working expenses: Per cubic feet per second of discharge at canal head	Occupiers' rate: Per acre irrigated	Occupiers' rate: Per cubic feet per second of discharge at canal head	Total water-rate, direct and indirect: Per acre irrigated	Total water-rate, direct and indirect: Per cubic feet per second of discharge at canal head
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
PRODUCTIVE WORKS	C.ft.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Acres	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Upper Ganges canal ..	5,738	67,74,906	42,808	68,17,714	14,88,289	83,06,003	84,75,724	19,18,306	1,497,408	23	1·28	334	4·52	1,181	5·54	1,448
Lower Ganges canal ..	3,785	36,12,627	12,098	36,24,725	7,60,872	43,85,597	46,04,623	14,00,678	896,241	30	1·56	370	4·03	954	4·89	1,159
Eastern Jumna canal ..	1,588	21,09,174	7,764	21,16,938	3,50,377	24,67,315	25,23,620	5,68,557	413,474	23	1·37	358	5·10	1,328	5·93	1,554
Agra canal	1,149	13,62,886	3,011	13,65,897	64,230	14,30,127	14,90,428	4,27,098	365,620	29	1·16	372	3·72	1,186	3·91	1,245
Sarda canal	6,103	42,37,388	2,666	42,40,054	19,436	42,59,490	43,49,553	19,85,619	912,106	46	2·17	325	4·64	694	4·66	698
Bijnor canals	77	71,240	710	71,950	14,984	86,934	89,107	26,743	25,251	30	1·05	317	2·82	925	3·44	1,129
Ramganga canal	105	1,59,419	..	1,59,419	..	1,59,419	1,62,908	1,24,637	20,663	77	6·03	1,187	7·71	1,518	7·71	1,518
Gogra canal	129	59,824	..	59,824	..	59,824	93,826	1,61,255	15,387	172	10·47	1,250	3·88	464	3·88	464
State tube-wells	..	31,12,022	..	31,12,022	2,102	31,14,124	31,49,982	27,84,765	589,410	88	4·72	..	5·27	..	5·28	..
Private tube-wells taken on lease by Government	..	11,503	..	11,503	..	11,503	11,520	10,481	2,095	91	5·00	..	5·49	..	5·49	..
Hydro-electric grid ..	..	..	..	..	..	..	38,20,806	17,71,742	..	46	..	..	..	..	..	..
Daurala sugarcane tramway ..	..	..	..	..	..	..	37,042	60,020	..	162	..	..	..	..	..	..
Total, Productive Works ..	..	2,15,10,989	69,057	2,15,80,046	27,00,290	2,42,80,336	2,88,09,139	1,12,39,901	4,737,655	..	..	..	..	..	..	..
UNPRODUCTIVE WORKS																
Rohilkhand canals ..	302	1,09,585	865	1,10,450	59,370	1,69,820	1,81,300	92,397	52,932	51	1·74	306	2·07	363	3·20	562
Dun canals	247	1,32,866	4,972	1,37,838	24,980	1,62,818	1,98,113	83,684	20,365	42	4·10	339	6·52	538	7·99	659
Betwa canal	837	6,10,674	..	6,10,674	2,860	6,13,534	6,26,184	2,84,723	162,510	45	1·75	340	3·75	730	3·77	733
Dhasan canal	416	1,70,066	..	1,70,066	1,592	1,71,[illegible]58	1,74,079	97,067	59,252	56	1·63	233	2·87	409	2·89	413

II-E

Statement showing incidence of working expenses and assessed water revenue on canals in the United Provinces during **1939-40—(concluded)**

Name of canal	Average discharge of the year at canal head in cubic feet per second	Water-rate assessed, 1939-40		Total		Total of Direct and Indirect	Gross assessed revenue from all sources	Working expenses, Direct and Indirect	Acres irrigated during 1939-40	Working expenses			Occupiers' rate		Total water-rate, direct and indirect	
		Occupiers'	Owners'	Direct	Indirect					Percentage on gross revenue	Per acre irrigated	Per cubic feet per second of discharge at canal head	Per acre irrigated	Per cubic feet per second of discharge at canal head	Per acre irrigated	Per cubic feet per second of discharge at canal head
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
UNPRODUCTIVE WORKS—(*concld.*).	C.ft.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Acres	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.
Pahuj and Garhmau canals ..	103	20,734	..	20,734	826	21,560	30,055	14,556	7,396	48	1·96	141	2·80	201	2·91	209
Barwar lake and canal ..	30	9,904	..	9,904	..	9,904	10,070	4,266	3,555	42	1·20	142	2·78	330	2·78	330
Siaori lake	17	5,464	..	5,464	..	5,464	5,599	2,980	2,150	53	1·38	175	2·54	321	2·54	321
Lakes and tanks, Jhansi district	..	10,766	..	10,766	1,415	12,181	13,601	10,817	3,978 *1,311*	80	2·71	..	2·70	..	3·06	..
Ken canal	778	3,43,134	..	3,43,134	..	3,43,134	3,50,773	1,61,414	109,381	46	1·47	207	3·13	441	3·13	441
Majhgawan tank	46	15,030	..	15,030	..	15,030	16,799	6,137	4,988	37	1·23	133	3·01	327	3·01	327
Aunjhar tank	8·4	2,695	..	2,695	..	2,695	2,731	10,880	932	398	11·67	1,295	2·89	321	2·89	321
Raipura tank	7·9	2,060	..	2,060	..	2,060	2,685	2,598	639	97	4·06	329	3·22	261	3·22	261
Belasagar tank	23	11,641	..	11,641	..	11,641	11,777	6,705	4,127	57	1·62	292	2·82	506	2·82	506
Kamalpura tank	7·3	1,940	..	1,940	..	1,940	2,595	2,149	512	83	4·19	294	3·78	266	3·78	266
Jaiwanti tank	11	1,631	..	1,631	..	1,631	2,076	1,294	620	62	2·08	118	2·63	148	2·63	148
Tanks in Banda district ..	..	8,695	..	8,695	..	8,695	9,219	6,578	2,924	71	2·24	..	2·97	..	2·97	..
Lakes and tanks, Hamirpur district.	24	6,624	..	6,624	1,763	8,387	9,266	6,607	2,226	71	2·96	275	2·97	276	3·76	349
Ghagar canal including Garai canal.	480	1,77,355	370	1,77,725	..	1,77,725	1,84,961	1,01,973	50,466	55	2·02	212	3·51	369	3·52	370
Ghori canal	27	1,567	..	1,567	..	1,567	1,662	4,002	494	241	8·10	148	3·17	58	3·17	58
Sukhra canal	15	1,781	..	1,781	..	1,781	1,857	2,299	504	125	4·56	153	3·53	119	3·53	119
Kitham reservoir	..	..	..	..	..	..	1,692	2,880	..	170	..	..	..	..	..	..
Total, Unproductive works ..	..	16,44,212	6,207	16,50,419	92,806	17,43,225	18,37,075	9,06,006	489,951 *1,311*	..	..	..	..	..	..	..
WORKS FOR WHICH NO CAPITAL AND REVENUE ACCOUNTS ARE KEPT.																
Tanks and bunds, Betwa canal division	..	2,000	..	2,000	..	2,000	2,000	..	1,871	..	..	..	1·06	..	1·06	..
Tanks, Jhansi division, Betwa canal	..	4,913	..	4,913	..	4,913	5,843	..	1,554 *151*	..	..	..	3·16	..	3·16	..
Jagnair tanks, Lower division, Agra canal	..	1,475	..	1,475	..	1,475	1,489	..	1,811	..	..	..	0·81	..	0·81	..
Tanks, Banda and Allahabad districts, Ken canal division.	..	4,726	..	4,726	..	4,726	4,757	..	5,431	..	..	..	0·87	..	0·87	..
Total ..	..	13,114	..	13,114	..	13,114	14,089	..	10,667 *151*	..	..	..	..	..	..	..
GRAND TOTAL ..	..	2,31,68,315	75,264	2,32,43,579	27,93,096	2,60,36,675	3,06,60,303	1,21,45,907	5,238,273 *1,461*	..	..	..	..	..	..	..

N.B.—Figures in *italics* in column 10 denote free irrigation.

NT

		Tanks in Banda district	Lakes and ... in Hamirpur district
		Value	Area irrigated
		56	57
		Rs.	Acres
		..	..
80		..	8
		..	21
		..	..
	7	1,575	..
		..	..
40	1	..	18
		..	..
	1	1,881	19
27	1		
25		..	..
		..	..
		..	..
	2	..	..
40		1,440	..
		..	..
		..	..
		..	..
		..	..
02		..	..
30			
		..	..
		..	..
70			
65			

I-F

STATEMENT SHOWING RATES IN FORCE ON CANALS IN THE UNITED PROVINCES DURING THE YEAR ENDING MARCH 31, 1940

I—Schedule of Occupiers' Rates

IN ORDINARY AREAS

(1) *Upper Ganges canal, Lower Ganges canal, Eastern Jumna canal, and Agra canal (except for lands irrigated in the Delhi and Gurgaon districts)*

Item no.	Nature of crop	Per acre irrigated Flow	Per acre irrigated Lift	Per
1	2	3	4	5
		Rs. a. p.	Rs. a. p.	
1	Sugarcane (Upper Ganges and Eastern Jumna canals)	10 0 0	4 0 0	Year.
2	Sugarcane (Lower Ganges and Agra canals) ..	9 0 0	3 0 0	Do.
3	Rice (Upper Ganges and Eastern Jumna canals) ..	7 8 0	3 0 0	Crop.
4	Rice (Lower Ganges and Agra canals)	6 0 0	2 8 0	Do.
5	Vegetables, orchards, gardens and waternuts ..	6 0 0	2 8 0	Orchards and gardens per half year; the rest per crop.
6	Other *kharif* crops	3 0 0	1 8 0	Crop.
7	Wheat and barley	5 0 0	2 8 0	Do.
8	Gram	2 8 0	1 4 0	Do.
9	Linseed, peas, poppy, tobacco and other *rabi* crops ..	4 0 0	2 0 0	Do.
9A	Lucerne, berseem and all fodder grasses and clovers..	3 0 0	1 8 0	Half year.

Where the supply of canal water has been proclaimed by notification to be precarious, the rates will be the same as above except in the following cases:

10	Sugarcane	7 8 0	3 0 0	Year.
11	Other *kharif* crops	2 8 0	1 0 0	Crop.
12	Wheat and barley	4 0 0	2 0 0	Do.

(2)* *Agra canal (in the Delhi and Gurgaon districts)*

1	Sugarcane (except on *kharif* channels)	12 0 0	6 0 0	Crop.
2	Sugarcane on *kharif* channels	10 0 0	5 0 0	Do.
3	Rice and waternuts	7 8 0	3 12 0	Do.
4	Cotton, indigo, and other dyes, tobacco, poppy, spices and drugs	5 8 0	2 12 0	Do.
5	Gardens orchards and vegetables (except turnips) ..	5 8 0	2 12 0	Gardens and orchards per half-year; the rest per crop.
6	Wheat, barley and oats (except on *kharif* channels)..	5 4 0	2 10 0	Crop.
7	Melons, maize, fibres (other than cotton) and all crops not otherwise specified	5 0 0	2 8 0	Do.
8	Oilseeds (except *rabi* oilseeds on *kharif* channels) ..	4 4 0	2 2 0	Do.
9	*Rabi* oil seeds, wheat, barley and oats on *kharif* channels, field peas and beans	3 12 0	1 14 0	Do.
10	*Bajra*, gram, *masur* and pulses	3 4 0	1 10 0	Do.
11	*Jawar*, China, grass, which has received two or more waterings and all fodder crops including turnips:	1 8 0	0 12 0	Grass per half year; the rest per crop.
	(*a*) Watering for ploughing not followed by a crop in the same or succeeding harvest ...	1 0 0	0 8 0	Acre.
	(*b*) Deleted	..	..	
	(*c*) Village or District Board plantations:			
	(i) Any number of waterings in *kharif* ..	1 0 0	0 8 0	Half-year.
	(ii) One watering in *rabi*	1 0 0	0 8 0	Do.
	(iii) Two or more waterings in *rabi* ..	2 0 0	1 0 0	Do.
	(*d*) Grass—A single watering in *kharif* or *rabi* ..	1 0 0	0 8 0	Do

NOTE—Grass given two or more waterings falls under item 11.

*The above rates include the owners' rate which is separately assessed in the United Provinces.

(3) *Dun canals*

1	Garden produce and orchards	10 0 0	5 0 0	Half-year.
2	Sugarcane and tea in nurseries	10 0 0	5 0 0	Year.
3	Transplanted rice, poppy and waternuts	7 8 0	3 12 0	Crop.
4	Broadcast rice, indigo, cotton, oats, old tea and other crops not specified.	3 6 0	1 14 0	Do.
5	Wheat, barley and other crops mixed with them ..	5 0 0	2 8 0	Do.
6	Lucerne, berseem and all fodder grasses and clovers ..	3 0 0	1 8 0	Half-year.

(4) *Bijnor canals*

1	Fruit garden and nursery garden..	4 8 0	2 8 0	Year.
2	Sugarcane	4 8 0	2 8 0	Do.
3	Rice irrigated before the monsoon rise of the rivers† ..	4 8 0	2 8 0	Crop.
4	Rice irrigated after the monsoon rise of the rivers† ..	1 12 0	1 0 0	Do.
5	Vegetables gardens, indigo, tobacco, waternuts, *ajwain*, etc.	4 8 0	2 8 0	Do.
6	Cotton, wheat, oats, barley and all pulses	2 8 0	1 8 0	Do.
7	Lucerne, berseem and all fodder grasses and clovers ..	3 0 0	1 8 0	Half-year.

†This date will be fixed by the Chief Engineer, United Provinces, Public Works Department, Irrigation Branch.

(5) *Betwa canal*

Item no.	Nature of crop	Per acre irrigated — Flow	Per acre irrigated — Lift	Per
1	2	3	4	5
		Rs. a. p.	Rs. a. p.	
1	Sugarcane	5 0 0	2 8 0	Year.
2	Tobacco, poppy, spices, vegetables, gardens, orchards, waternuts and all *rabi* crops, except unmixed gram, linseed, lucerne and peas	4 0 0	2 0 0	Crop.
3	Gram, linseed, peas, and all *kharif* crops not separately specified	2 0 0	1 0 0	Do.
4	Lucerne, berseem and all fodder grasses and clovers ..	2 0 0	1 0 0	Half-year.

(6) *Dhasan canal, Lakes and tanks situated in the Jhansi and Hamirpur districts, Banpur tank in the Jhansi district, Majhgawan, Belasagar and Kamalpura tanks, Raipura tank and canals, Kulpahar tank and Jaiwanti and Aunjhar tanks*

Item no.	Nature of crop	Flow	Lift	Per
1	Sugarcane	5 0 0	2 8 0	Year.
2	Tobacco, poppy, spices, vegetables, gardens, orchards and waternuts	4 0 0	2 0 0	Crop.
3	Wheat and barley and crops mixed with wheat and barley	3 0 0	1 8 0	Do.
3A	Lucerne, berseem and all fodder grasses and clovers ..	2 0 0	1 0 0	Half year.
4	Rice and all other crops irrigated in *kharif* or *rabi* ..	2 0 0	1 0 0	Crop.

(7) *Pahuj and Garhmau canals, Jhansi district*

Item no.	Nature of crop	Flow	Lift	Per
1	Sugarcane	5 0 0	2 8 0	Year.
2	Tobacco, poppy, spices, vegetables, gardens, orchards and waternuts	4 0 0	2 0 0	Crop.
3	All *rabi* crops except unmixed gram, linseed, lucerne and peas	3 0 0	1 8 0	Do.
4	Gram, linseed, peas and all *kharif* crops not separately specified	2 0 0	1 0 0	Do.
5	Lucerne, berseem and all fodder grasses and clovers ..	2 0 0	1 0 0	Half-year.

(8) *Barwar lake and canal*

Item no.	Nature of crop	Flow	Lift	Per
1	Sugarcane	5 0 0	2 8 0	Year.
2	Tobacco, poppy, spices, vegetables, gardens, orchards and waternuts	4 0 0	2 0 0	Crop.
3	Wheat and barley and crops mixed with wheat and barley	3 0 0	1 8 0	Do.
4	All other *rabi* crops except unmixed gram, linseed, *masur* and peas	3 0 0	1 8 0	Do.
5	Gram, linseed, *masur*, peas and all *kharif* crops not separately specified	2 0 0	1 0 0	Do.
6	Lucerne, berseem and all fooder grasses and clovers ..	2 0 0	1 0 0	Half-year.

(9) *Ken canal*

Item no.	Nature of crop	Flow	Lift	Per
1	Sugarcane	5 0 0	2 8 0	Year.
2	Tobacco, poppy, spices, vegetables, gardens, orchards and waternuts, wheat, barley and crops mixed with wheat and barley	3 0 0	1 8 0	Crop.
3	Rice	4 0 0	2 0 0	Do.
3A	Lucerne, berseem and all fodder grasses and clovers ..	2 0 0	1 0 0	Half-year.
4	All other crops irrigated in *kharif* or *rabi* ..	2 0 0	1 0 0	Crop.

(10) *Ghori and Sukhra canals, Garai canal, and Ghagar canal, Mirzapur*

Item no.	Nature of crop	Flow	Lift	Per
1	Sugarcane	5 0 0	2 8 0	Year.
2	Rice, vegetables, orchards and garden produce ..	4 0 0	2 0 0	Crop.
3	Wheat and barley	3 0 0	1 8 0	Do.
3A	Lucerne, berseem and all fodder grasses and clovers ..	2 0 0	1 0 0	Half-year.
4	Other *kharif* and *rabi* crops	2 0 0	1 0 0	Crop.

(11) *Karamnasa canals, Mirzapur*

Item no.	Nature of crop	Rate per acre		Per
		Flow.	Lift	
1	2	3	4	5
		Rs. a. p.	Rs. a. p.	
1	All crops irrigated during *kharif*	1 8 0	0 12 0	Crop.

(12) *Rohilkhand canals*

1. All lands irrigated—

(i) from channels constructed or maintained by Government, or

(ii) from private water-courses with masonry heads or escapes constructed or maintained by Government, or

(iii) from private water-courses above the dams, weirs or bunds constructed and maintained by Government for the channels included in (i) above, that draw their supplies from any of the undermentioned rivers or streams :

East Bahgul,	Dhora,	Baror,
Deoranian,	Kichha,	West Bahgul,
Sankha,	Paha or Gola,	Kulli,

shall be assessed at the occupiers' rates shown in Schedule A.

Exceptions—(i) Land situated in any of the villages specified in Schedule C shall be assessed at the occupiers' rates shown in Schedule B.

(ii) Irrigation done direct from the East Bahgul river from one mile above Choreli dam to Girem dam shall be charged at the occupiers' rates laid down for the Sarda canal and those channels of the Rohilkhand canals division fed with Sarda canal water.

(iii) All lands irrigated in the Naini Tal district shall be assessed at the occupiers' rates shown in Schedule F.

2. All lands irrigated from private water-courses for which bunds are constructed annually by Government that derive their supplies from any of the undermentioned rivers or streams :

Pangeli,

Dhora below Dhora dam,

Baror below Baror dam,

shall be assessed at the occupiers' rate shown in Schedule D.

Exception—(i) Lands situated in any of the villages specified in Schedule C shall be assessed at the occupiers' rates shown in Schedule E.

SCHEDULE A

Item no.	Nature of crop	Rate per acre		Per.
		Flow	Lift	
		Rs. a. p.	Rs. a. p.	
1	Sugarcane, gardens, orchards, vegetables, tobacco, opium and waternuts..	4 10 8	3 0 0	Year.
2	Rice irrigated before 15th June	4 0 0	2 0 0	Crop.
3	Wheat, barley, rice irrigated after 15th June and all other crops not separately specified	2 0 0	1 0 0	Do.
4	Lucerne, berseem and all fodder grasses and clovers ..	2 0 0	1 0 0	Half-year.

SCHEDULE B

1	Sugarcane, gardens, orchards, vegetables, tobacco, opium and waternuts	3 10 8	2 0 0	Year.
2	Rice irrigated before 15th June	3 0 0	1 8 0	Crop.
3	Wheat, barley, rice irrigated after 15th June and all other crops not separately specified	1 5 4	0 10 8	Do.
4	Lucerne, berseem and all fodder grasses and clovers ..	1 5 4	0 10 8	Half-year.

SCHEDULE C

District	Pargana	Village	Remarks
Bareilly ..	Chaumahla ..	Amdanda.	
		Arsia Boj.	
		Bahadurpur.	
		Bhounan.	
		Bhikaripur.	
		Rirya.	
		Dandi Abbeychand.	
		Deoheri.	
		Jagnun Nagar.	
		Karim Nagar.	
		Kaharipur Lokhipura.	
		Khatania.	
		Mauna Patti.	
		Mundi.	
		Mundla Mukarbpur.	
		Nawabnagar.	
		Pirohi,	
		Ramnagar.	
		Ratanpuri *urf* Nendaudi.	
		Richaula.	
		Richauli.	
		Fazilpur.	
		Firozpur.	
		Harsa Nagla.	
		Mukatpur.	
		Saiyidpur Khurd.	
		Bagiya,	
		Bhilone.	
		Faizganj.	
		Hatmana.	
		Jawaharpur.	
		Madhapur.	
		Malkaria.	
		Nala.	
		Nali.	
		Nazarganj.	
		Patairi.	
		Piparya Ganesh.	
		Pirtheepur,	
		Raitwar.	
		Retagarh.	
		Sirsa.	
		Wasahdandi	
		Bhairpura.	
		Narsua.	
		Abbeypur.	
		Bhanpur.	
		Bhimri.	
		Gagu Nagla.	
		Karampur.	
		Lakheri.	
		Lakhimpur.	
		Pindari Abbeychand.	
		Punai.	
		Thana.	
		Waris Patti.	
	Richha ..	Nandeli.	
		Harharpur Sumakhia.	
		Pandna.	
		Katharia Jagir.	
		Pandri.	
		Utarsi Sumakhia Bhuria.	
		Chitauma Malhpur.	
		Am-Khera.	
		Fardiya Mankara.	
		Sili Jagir.	
		Utarsia Maholia.	
Pilibhit ..	Jahanabad ..	Balpur,	
		Bilhra,	
		Bhainsa.	
		Ballia,	
		Barhepura.	
		Babka.	
		Hetemdandi.	
		Katmati,	
		Tigri.	
		Bakshpur.	
		Mundelia Ghosu.	

SCHEDULE D

Item no.	Nature of crop	Rate per acre Flow	Rate per acre Lift	Per
		Rs. a. p.	Rs. a. p.	
1	Sugarcane, gardens, orchards, vegetables, tobacco, opium and waternuts	2 5 4	1 8 0	Year.
2	Rice irrigated before 15th June	2 0 0	1 0 0	Crop.
3	Wheat, barley, rice irrigated after 15th June and all other crops not separately specified	1 0 0	0 8 0	Do.
4	Lucerne, berseem and all fodder grasses and clovers ..	1 0 0	0 8 0	Half-year.

SCHEDULE E

Item no.	Nature of crop	Flow	Lift	Per
1	Sugarcane, gardens, orchards, vegetables, tobacco, opium and waternuts	1 2 8	0 13 4	Year.
2	Rice irrigated before 15th June	1 0 0	0 8 0	Crop.
3	Wheat, barley, rice irrigated after 15th June and all other crops not separately specified	0 10 8	0 5 4	Do.
4	Lucerne, berseem and all fodder grasses and clovers ..	0 10 8	0 5 4	Half-year.

SCHEDULE F

Item no.	Nature of crop	Flow	Lift	Per
1	Sugarcane, gardens, and orchards	1 12 9	0 14 4½	Year.
2	Early rice, tobacco, opium, vegetables, melons and waternuts	1 4 9	0 10 4½	Crop.
2A	Lucerne, berseem and all fodder grasses and clovers ..	0 8 0	0 8 0	Half-year.
3	Late rice and other crops not specified above	0 8 0	0 8 0	Crop.

(13) *All canals mentioned above in (1) to (12)*

Crop	Rate per acre Flow	Rate per acre Lift
	Rs. a. p.	Rs. a. p.
Sanai (if sown for green-manuring and irrigated after 1st June and ploughed up before 1st October)	1 0 0	0 8 0

(14) *Sarda canal, canals situated in the Rohilkhand canals division and fed with Sarda canal water, irrigation from the Absara nadi between the escape on the Deoha Bahgul feeder and the Keolaria dam, and irrigation from the East Baghul river from one mile above Choreli dam to Girem dam*

Item no.	Nature of crop	Unit	Rate per acre for three years commencing *rabi* 1933-34, *Fasli* 1341 — Flow	Lift	Final rate per acre after *kharif* 1936, *Fasli* 1344, i.e. commencing *rabi* 1936-37, *Fasli* 1344 — Flow	Lift
1	2	3	4		5	
			Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
1	Sugarcane	Per year ..	10 0 0	4 0 0	10 0 0	4 0 0
2	Tobacco, vegetables, gardens, orchards and waternuts.	Gardens and orchards* per half-year and rest per crop.	6 0 0	2 8 0	6 0 0	2 8 0

Item no.	Nature of crop	Unit	Rate per acre for three years commencing *rabi* 1933-34, *Fasli* 1341		Final rate per acre after *kharif* 1936, *Fasli* 1344, i.e. commencing *rabi* 1936-37, *Fasli* 1344	
1	2	3	4		5	
			Flow	Lift	Flow	Lift
			Rs. a. p.	Rs. a. p.	Rs. a. p.	Rs. a. p.
3	Wheat and barley, and other crops mixed with wheat and barley:					
	(*a*) Deoha Bahgul feeder, head to tail and all channels taking off the Bahgul river at the Choreli dam.†	Per crop ..	3 0 0	1 8 0	4 0 0	2 0 0
	(*b*) All other channels ..	Ditto ..	4 0 0	2 0 0	5 0 0	2 8 0
4	*Rice*‡:					
	(*a*) Broadcast ..	Ditto ..	3 0 0	1 8 0	4 0 0	2 0 0
	(*b*) Transplanted ..	Ditto ..			6 10 8	3 0 0
5	Cotton	Ditto ...	3 0 0	1 8 0	3 0 0	1 8 0
6	Sawan	Ditto ..	3 0 0	1 8 0	3 0 0	1 8 0
7	Gram, *masur* and linseed	Ditto ..	2 0 0	1 0 0	2 8 0	1 4 0
8	Poppy, peas and all other *kharif* and *rabi* crops not separately specified.	Ditto ..	2 0 0	1 0 0	3 0 0	1 8 0
9	Green manure (*sanai*)§ ..	Ditto ..	1 0 0	0 8 0	3 0 0	1 8 0
10	Lucerne, berseem and all fodder grasses and clovers.	Half-year ..	..	..	3 0 0	1 8 0

* Half-years run from 1st April to 30th September and from 1st October to 31st March.

† Kailas canal, Absara distributary, Left Choreli distributary and Richha branch.

‡ In the case of item 4 the rates for broadcast and transplanted rice will continue to be Rs.3 flow and Re.1-8 lift as a temporary measure until further notice.

§ The rate for *sanai* irrigated after 1st June, and ploughed up before 1st October of the same year will continue to be Re.1 flow and annas 8 lift per acre until further notice, other *sanai* will be charged at the rates shown in column 5 against item 9.

(15) *Ramganga canal*

Item no.	Nature of crop	Per acre irrigated		Per
		Flow	Lift	
1	2	3	4	5
		Rs. a. p.	Rs. a. p.	
1	Sugarcane	14 8 0	7 0 0	Year.
2	Early *kharif* and transplanted rice irrigated before the monsoon rise of the river.†	14 8 0	7 0 0	Crop.
3	Late rice and other *kharif* crops irrigated after the monsoon rise of the river.†	5 0 0	2 8 0	Do.
4	Vegetables, orchards, gardens and water nuts	8 8 0	4 0 0	Gardens and orchards per *half-year and the rest per crop.
5	Wheat and barley	7 0 0	3 8 0	Crop.
6	Linseed, poppy, peas, lucerne, tobacco and other *rabi* crops	6 0 0	3 0 0	Do.
7	Gram	4 0 0	2 0 0	Do.

* Half years run from 1st April to 30th September and from 1st October to 31st March.

† This date will be fixed by the Chief Engineer, United Provinces, Public Works Department, Irrigation Branch.

15(*a*) *Gogra canal*

Item no.	Crop	Rate per acre		Per
		Flow	Lift	
		Rs. a. p.	Rs. a. p.	
1	*Rabi*	3 0 0	1 8 0	Crop.
2	Sugarcane	8 0 0	4 0 0 (for 1346 *Fasli* only)	Year.
		12 0 0	6 0 0 (from and including 1347 *Fasli*)	Do.
3	Rice	5 0 0	2 8 0	Crop.
4	Other *kharif*	2 0 0	1 0 0	Do.

The above rates took effect from 1st April, 1938.

(16) *Canal irrigation within municipal limits and the Lucknow Cantonments*

(*a*) The rates for all crops or gardens irrigated within municipal limits from canals in the United Provinces as well as in the Delhi and Gurgaon districts shall be Rs.16 per acre for flow and Rs.8 per acre for lift, per year, half year or crop, as laid down in the schedules of rates relating to the different canals.

Exceptions—(i) Canal water supplied to the Cawnpore Turbine Pumping Scheme.

(ii) Canals in the Bundelkhand.

(iii) Canal irrigation in Cawnpore Improvement Trust lands situated within the boundaries of the Cawnpore Municipality.

(*b*) The rates for watering sports grounds or grass lands inside the Lucknow Cantonments shall be Rs.16 per acre per year for flow and Rs.8 per acre per year for lift.

(*c*) The rates for all crops and gardens irrigated within the municipal limits in the Bundelkhand shall be as laid down in the schedule relating to the canal from which irrigation is done.

(*d*) Irrigation rates as laid down in the schedule no. (1), plus a surcharge of 25 per cent. shall be levied on all lands in the possession of the Cawnpore Improvement Trust within the southern and western tracts of the Cawnpore Municipality as detailed below:

(i) The southern tract is bounded on the north by the Kalyanpur distributary, on the east by the Cawnpore branch, on the south by the municipal boundary and on the west by the municipal boundary and the Kalpi road.

(ii) The western tract is bounded on the north and west by the Banna Jhabar road, on the east by the Bombay, Baroda and Central India Railway siding and on the south by the Grand Trunk road (municipal limit).

Should the municipal board extend their boundary further to the south, any Improvement Trust land within the extended boundary shall pay irrigation rates as laid down above.

NOTE—Lucerne, berseem and all fodder grasses and clovers referred to in schedules (1), (3) to (10), (12) and (14), as amended by Standing Order no. 28, dated the 16th October, 1937, include only the following crops:

Serial no.	English name	Local name	Botanical name	Whether Leguminous or non-Leguminous
		(A) Seasonal Fodders		
1	Berseem	Berseem ghas ..	Trifolium alexandrinum ..	Leguminous.
2	Kabul clover	Shaftal	Trifolium resupinatum ..	Ditto.
3	Indian clover	Senji	Melilotus parviflora ..	Ditto.
4	Cluster bean	Guar	Cyamopsis psoralioides ..	Ditto.
5	Fenugreek	Metha or Methi ..	Trigonella foenum-graecum	Ditto.
6	Chick pea	Moth	Phascolus aconitifolius ..	Ditto.
7	Sunflower	Surajmukhi ..	Helianthus annus ..	Non-Leguminous.
		(B) Perennial Fodders		
1	Lucerne	Rizqa	Medicago sativa ..	Leguminous.
2	Elephant grass or Napier grass.	Napier ghas ..	Pennisetum purpureum ..	Non-Leguminous.
3	Guinea grass	Gini ghas	Parricum jumentorum ..	Ditto.
4	Rhodes grass	Rhod ghas.. ..	Chlosis	Ditto.
5	Teff grass	Tef ghas	Eragrostes abyssineca ..	Ditto.
6	China grass	Chini ghas ..	Boehmerianivea ..	Ditto.

II—Rates for water used for other than irrigation purposes

Item no	Purpose for which used	Rate	Per
	(1) *Upper Ganges, Lower Ganges, Agra (including Delhi and Gurgaon districts), Eastern Jumna (including Delhi district), Sarda, Rohilkhand, Bijnor, Betwa, Ken, Dhasan, Ghagar, Ghori, Sukhra, and Garai canals, Barwar lake and canal, Jhansi and Hamirpur lakes, Majhgawan and Kulpahar tanks, and Pahuj and Garhmau canals*		
		Rs. a. p.	
1	Brick or tile-making	0 4 0	100 c. ft. of stacked bricks or 1,000 tiles or unstacked bricks.
2	Masonry (*kachcha* or *pakka*) and mud walling	0 4 0	100 c. ft.
3	Metalling roads	24 0 0	Mile.
4	Land watered for the collection of *reh*	2 0 0	Acre operated on during the season by flow irrigation.
		1 0 0	Acre operated on during the season by lift irrigation.
5	Water supplied in bulk	2 8 0	5,000 c. ft.
6	Plaster (new or for repairs) ..	0 1 6	100 sq. feet.
7	Pot kilns	0 8 0	Kiln.
	(2) *Dun canals*		
1	Moulding bricks 8"×4"×2" (other sizes in proportion)	48 0 0	Lakh.
2	Tile-making	0 8 0	Thousand.
3	Masonry (*kachcha* or *pakka*) and mud wall building ..	0 8 0	100 c. ft.
4	Metalling roads	48 0 0	Mile.
5	Water supplied in bulk for domestic purposes	1 0 0	1,000 c. ft.
6	Pot kilns	0 10 0	Kiln.
7	Plaster (new or for repairs) ..	0 8 0	100 sq. ft.
	(3) *Ramganga canal*		
1	Tile making	0 6 0	1,000.
2	Bricks	0 6 0	100 c. ft. of stacked bricks or 1,000 unstacked bricks.
3	Masonry (*kachcha* or *pakka*) and mud walling	0 6 0	100 c. ft.
4	Metalling roads	36 0 0	Mile.
5	Land watered for the collection of *reh*	3 0 0	Acre operated on during the season by flow irrigation.
		1 8 0	Acre operated on during the season by lift irrigation.
6	Water supplied in bulk	0 12 0	1,000 c. ft.
7	Plaster (new or for repairs) ..	0 2 0	100 sq. ft.
8	Pot kilns	0 12 0	Kiln.
	(4) *Gogra canal*		
		Rs. a. p.	
1	Tile-making	0 6 0	1,000
2	Bricks	0 6 0	100 c. ft. of stacked bricks or 1,000 unstacked bricks.
3	Masonry (*kachcha* or *pakka*) and mud-walling.	0 6 0	100 c. ft.
4	Metalling roads	36 0 0	Mile.
5	Land watered for the collection of *reh*	3 0 0	Acre operated on during the season by flow irrigation.
	..	1 8 0	Acre operated on during the season by lift irrigation.
6	Water supplied in bulk	0 12 0	1,000 c. ft.
7	Plaster (new or for repairs) ..	0 2 0	100 sq. ft.
8	Pot kilns	0 12 0	Kiln.

The above rates took effect from 1st April, 1938.

III—Navigation rates

Upper and Lower Ganges canals

Class	Beam	Tolls	
		Per year	Per quarter
		Rs.	Rs.
A	Over 10 feet	100	40
B	From 6 to 10 feet	80	32
C	Under 6 feet	40	16

1. The year for which an annual ticket is issued shall count from 1st April to 31st March. Under no circumstances will refunds be given on annual tickets.

2. Refunds may be allowed on quarterly tolls when the supply of water in the canal falls short of that which, in the opinion of Chief Engineer, is required for navigation and for the time during which a boat is—

(i) removed from the canal for repairs ;

(ii) lying in dock in any length of the canal which may have been set aside for the purpose by the divisional canal officer;

(iii) lying or plying on the river.

Provided that no refund shall be allowed for any period of less than fourteen continuous days.

3. Navigation will only be carried on at such times as the Irrigation branch can supply water for navigation *without prejudice to irrigation interests.*

Schedule of rates for rafts, Upper and Lower Ganges canals

		Rs. a. p.	
1.	Logs, round or square exceeding 2½ feet in girth	0 1 6	100 c.ft. of raft.
2.	Logs less than 2½ feet in girth, including karis, ballas, sleepers, etc.	0 0 9	Ditto.
3.	Bamboos	0 4 6	Raft.
4.	Firewood (fuel logs)	0 1 0	1,000 c.ft.

Rafts of the third class are subject to a minimum charge of Rs.1-11 and a maximum of Rs.22-8.

IV—Owners' Rate

Abstract of rules regarding assessment of owners' rate

1. On all canal irrigated land in revenue-paying *mahals*, which was not assessed to land revenue on the basis of "wet" rates in the course of the most recent settlement, the owners' rate shall be levied at one-third of the occupiers' rate for such land:

Provided that in any *mahal* such owners' rate shall in no case exceed the sum, which, under the law for the time being in force for the assessment of land revenue, might be or has been assessed on such land on account of the increase in the annual value or produce thereof resulting from canal irrigation; that is, it shall not exceed a percentage of the difference between the "wet" and "dry" rent-rates for similar classes of land which shall be the percentage of net assets at which land revenue might be or has been assessed on the *mahal.* (*Vide* Irrigation branch notification no. 11132-I.W./17-B.—64-W., dated the 2nd September, 1936).

Explanation—(i) For the purpose of deciding whether owners' rate is chargeable, the field shall be taken as the unit, so that, in the case of any field in respect of which land revenue was assessed according to "dry" rates, owners' rate will be payable when the field comes under canal irrigation.

(ii) It is immaterial whether land was irrigated from canals or from any other source at the time of settlement; the criterion is whether "wet" or "dry" rates were used as the basis for assessment in respect of that land.

2. On canal-irrigated land in revenue-free *mahals*, owners' rate shall be paid by the proprietors at one-third of the occupiers' rate in respect of all land on which occupiers' rate is levied; provided that the maximum prescribed for land in revenue-paying *mahals* under the proviso to rule (1) is not exceeded. (*Vide* Irrigation branch notification no. 11132-I.W./17-B,—64-W., dated the 2nd September, 1936.)

3. As regards lands where the owners are distinct from the grantees of the land revenue, and where the revenue was assessed at last settlement, but assigned to the grantees, owners' rate shall be paid by the proprietors in accordance with rule (1). (*Vide* Irrigation branch notification no. 11132-I.W./17-B,—64-W., dated the 2nd September, 1936.)

4. In the case of lands irrigated from the Upper Ganges canal, Lower Ganges canal (including the Halwakhanda distributary but excluding the Fatehpur branch and the Ghatampur distributary extension), Agra and Eastern Jumna canals, owners' rate is calculated on the basis of the occupiers' rate in force previous to the issue of Revenue department notification

no. 3376/I—98-A, dated the 15th December, 1892 [*vide* Revenue (Miscellaneous) department notification no. 2688/I—98-A, dated the 19th September, 1893]. (*See* also Irrigation branch notification nos. 843 and 845-I.W./17-B.—64-W., dated the 16th May, 1930.)

5. The owners' rate assessed on lands in the Muttra and Agra districts, irrigated from the Agra canal, is one-sixth of the occupiers' rate (*vide* Revenue department notification no. 1407, dated the 20th August, 1890).

6. No owners' rate is levied on the lands irrigated by the Betwa canal or on lands irrigated by the Fatehpur branch, Lower Ganges canal, excluding the Halwakhanda distributary, *vide* Irrigation branch notification no. 843-I.W./17-B,—64-W., dated the 16th May, 1930, and letter no. 3130-I, dated the 24th November, 1885.

7. No owners' rate shall be levied in any *mauza* into which canal irrigation was introduced for the first time as a consequence of the extension of the Ghatampur distributary, *vide* Irrigation branch notification no. 845-I.W./17-B,—64-W., dated the 16th May, 1930.

8. Owners' rate imposed on lands irrigated from the Dun and Bijnor canals shall be one-third of the occupiers' rate for the time being charged, *vide* Irrigation branch notification no. 1802-I, dated the 13th June, 1899.

9. In the case of the Rohilkhand canals owners' rate is levied at one-third of the occupiers' rate in force previous to the issue of Irrigation branch notification no. 4460-I, dated the 1st December, 1897, *vide* Irrigation branch notification no. 3823-I, dated the 13th December, 1898.

10. No owners' rate is leviable in respect of lands irrigated from Government channels in the Mirzapur district, *vide* Irrigation branch notification no. 3552-I.M./17-B.—83W., dated the 21st August, 1917.

11. No owners' rate is charged on lands newly irrigated from the Sarda canal or its channels.

12. Owners' rate assessed as a direct charge on all lands irrigated in the Benares State from the Garai canal in the Mirzapur canals sub-division is one-third of the occupier's rate, *vide* Irrigation branch G. O. no. 206-I.W,/17-B,—64-W.-I, dated the 29th February, 1928.

13. No owners' rate is leviable on lands irrigated from the following canals, lakes and tanks :

(1) Ken canal.
(2) Dhasan canal.
(3) Majhgawan tank.
(4) Kulpahar tank.
(5) Raipura tank and canals.
(6) Barwar lake and canal.
(7) Banpur tank.
(8) Pahuj and Garhmau canals.
(9) Lakes and tanks in Jhansi and Hamirpur districts.
(10) Belasagar tank.
(11) Kamalpura tank.

14. No owners' rate is leviable on areas irrigated in Delhi and Gurgaon districts from the Agra canal.

SUPPLEMENTARY STATISTICS

No. 1—Statement showing mileage of channels in the United Provinces under various heads at the end of the year 1939–40

Canal	Main canal and branches	Distributaries	Drainage cuts	Navigation escapes and mill channels	Total	Increase or decrease as compared with 1938–39
	Miles	Miles	Miles	Miles	Miles	Miles
Upper Ganges	568	3,379	1,867	107	5,921	+5
Lower Ganges	662	3,159	1,084	97	5,002	−6
Eastern Jumna ..	129	809	455	32	1,425	+16
Agra	100	900	262	55	1,317	+5
Sarda	912	3,370	1,552	128	5,962	+16
Bijnor	..	78	..	4	82	..
Ramganga	..	101	..	..	101	..
Tube-wells (Agr. canal) ..	..	3	..	..	3	..
Gogra	..	120	6	1	127	+7
Total ..	2,371	11,919	5,226	424	19,940	+43
Rohilkhand (proper) ..	..	278	7	8	293	−1
Dun	..	90	..	..	90	−1
Betwa	157	615	42	23	837	+4
Dhasan	107	186	11	8	312	..
Pahuj and Garhmau ..	..	67	3	1	71	..
Ken	86	259	16	7	368	+2
Majhgawan tank ..	..	30	..	..	30	..
Ghagar	67	170	7	4	248	..
Ghori	..	11	..	..	11	..
Sukhra	..	7	..	..	7	..
Lakes	11	139	2	1	153	..
Tanks	10	71	..	..	81	..
Total ..	438	1,923	88	52	2,501	+4
GRAND TOTAL ..	2,809	13,842	5,314	476	22,441	+47

No. 2—Comparative table of rainfall in the United Provinces during the years 1938–39 *and* 1939-40, *referred to in Section II of the Report*

Canal tract	1938–39			1939–40			Normal rainfall
	Kharif	*Rabi*	Total	*Kharif*	*Rabi*	Total	
	Inches	Inches	Inches	Inches	Inches	Inches	Inches
Upper Ganges	18·00	1·68	19·68	20·00	3·10	23·10	28·67
Lower Ganges	26·63	2·22	28·85	25·98	2·10	28·08	32·00
Eastern Jumna	18·00	2·31	20·31	18·44	4·42	22·86	32·00
Agra	13·81	0·82	14·63	22·82	2·81	25·63	25·18
Sarda	46·93	2·21	49·14	28·85	3·74	32·59	40·76
Bijnor..	28·46	2·41	30·87	35·88	4·39	40·27	44·80
Ramganga	25·16	1·48	26·64	26·65	5·18	31·83	36·90
Gogra	50·96	1·98	52·94	37·74	1·99	39·73	..
State tube-wells	15·80	1·74	17·54	24·03	3·88	27·91	31·14
Leased tube-wells.. ..	..	..	..	25·80	2·40	29·20	..
Rohilkhand	36·88	2·59	39·47	30·81	5·07	35·88	48·10
Dun	67·77	4·51	72·28	75·60	10·46	86·06	84·90
Betwa	32·20	1·59	33·79	30·17	1·26	31·43	31·70
Dhasan	37·37	1·77	39·14	27·72	1·24	28·96	36·00
Pahuj and Garhmau ..	28·06	1·46	29·52	23·43	1·36	24·79	32·56
Barwar lake	33·60	1·20	34·80	33·10	..	33·10	33·47
Siaori ,, ...	37·80	1·40	39·20	35·45	1·30	36·75	33·47
Lakes and tanks in Jhansi district.	6·23	0·49	6·72	28·51	0·69	29·20	38·47
Ken	37·53	2·46	39·99	36·68	1·37	38·05	39·90
Majhgawan tank	38·70	2·30	41·00	23·35	0·95	24·30	36·00
Aunjhar ,, ...	28·80	2·75	31·55	40·80	1·40	42·20	36·00
Raipura ,, ...	38·15	3·30	41·45	32·40	1·60	34·00	35·00
Belasagar ,, ...	25·21	0·75	25·96	25·12	2·06	27·18	36·00
Kamalpura ,, ...	25·25	1·55	26·80	25·30	3·90	29·20	31·20
Jaiwanti ,, ...	13·90	1·20	15·10	42·70	2·00	44·70	35·00
Tanks in Banda district ..	25·85	2·81	28·66	21·28	0·53	21·81	39·90
Lakes and tanks in Hamirpur district	30·70	2·75	33·45	29·26	1·66	30·92	36·00
Ghagar canal including Garai canal	45·84	4·45	50·29	41·12	4·24	45·36	45·00
Ghori	44·20	4·90	49·10	49·80	3·10	52·90	46·00
Sukhra	41·00	4·60	45·60	46·50	2·80	49·30	46·00
Tanks in Agra district ..	17·00	..	17·00	13·10	..	13·10	25·00

No. 3—Statement showing area irrigated by canals in the United Provinces for the last fifteen years (1925-26 to 1939-40)

No. 3—Statement showing area irrigated by canals in the

Year		Upper Ganges canal	Lower Ganges canal	Eastern Jumna canal	Agra canal	Sarda canal	Bijnor canals	Ramganga canal	Gogra canal	Tube-wells (Agr.)	Tube-wells (State)	Tube-wells taken on lease	Meerut distributary tail and Daurala electrification	Rohilkhand canals
1		2	3	4	5	6	7	8	9	10	11	12	13	14
		Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
1925-26	..	1,158,832	674,595	367,894	209,175	..	27,943	..	..	..	..	..	..	115,919
1926-27	..	1,180,378	776,282	350,075	207,865	..	29,654	..	..	..	..	..	..	144,981
1927-28	..	1,101,230	479,708	316,877	207,543	..	23,575	..	..	..	..	..	..	77,983
1928-29	..	1,511,129	1,013,043	395,294	354,434	335,147	28,977	..	..	..	..	..	..	108,780
1929-30	..	1,521,216	1,057,668	391,013	372,607	600,178	23,420	..	..	..	..	..	..	92,750
1930-31	..	1,505,667	839,932	375,671	365,307	539,313	24,970	12,611	..	..	..	..	..	47,719
1931-32	..	1,256,347	689,323	360,304	254,919	600,205	22,853	12,401	..	..	..	..	..	37,737
1932-33	..	1,218,222	835,988	325,092	275,070	851,679	22,455	15,832	..	1,236	..	..	..	40,225
1933-34	..	1,165,383	968,616	283,361	241,578	755,684	15,255	6,649	..	585	..	..	..	33,703
1934-35	..	1,179,071	823,760	361,956	260,627	736,802	25,350	21,068	..	947	30,030	854	955	37,338
1935-36	..	1,180,048	941,111	326,437	235,002	1,014,053	25,224	17,351	..	631	124,641	1,121	8,897	37,764
1936-37	..	1,176,273	877,266	326,426	241,515	652,685	21,363	13,456	..	187,656		1,328	*	35,649
1937-38	..	1,420,626	1,105,761	358,542	395,757	1,013,125	21,676	15,587	..	418,583		2,101	*	46,421
1938-39	..	1,598,933	962,456	423,732	389,903	852,344	22,989	15,725	12,583	583,517		2,112	*	50,125
1939-40	..	1,497,408	896,241	413,474	365,620	912,106	25,251	20,663	15,387	589,410		2,095	*	52,932

NOTE—Figures in italics

* Merged in Ganges canal.

United Provinces for the last fifteen years (1925–26 *to* 1939–40)

Dun canals	Betwa canal	Dhasan canal	Paluj and Garhmau canals	Ken canal	Majhgawan tank	Garai canal	Ghagar canal	Ghori canal	Sukhra canal	Lakes	Tanks	Sot nadi	Magarpur tank	Kulpahar tank	Total
15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acs.	Acs.	Acs.	Acres
14,802	80,671	23,994	5,163	75,024	3,718	16,565	11,465	614	560	7,742	9,471	..	442	189	2,804,778
21,839	114,811	35,419	4,371	64,413	3,782	19,019	13,330	787	725	8,057	13,023	..	455	255	2,989,516
15,933	82,628	282	539	84,701	450	16,057	17,211	1,062	695	1,216	9,386	..	172	3	2,337,251
19,958	162,973	37,588	6,771	82,879	5,168	19,069	20,537	818	368	6,396	3,838	8,918	289	191	4,122,565
19,233	194,884	39,680	7,691	119,007	5,854	20,051	23,358	1,177	738	10,495	17,905	12,441	12	413	4,531,791
21,019	62,374	26,233	4,527	93,305	3,433	17,578	21,936	382	250	5,622	20,320	14,085	..	..	4,002,254
20,001	82,440	24,198	4,000	60,145	2,554	19,869	21,405	479	821	6,095	13,557	10,790	..	..	3,499,943
17,692	118,040	36,234	4,663	121,980	3,824	20,625	18,365	837	683	6,522	15,076	11,252	..	..	3,961,597
14,060	112,845	37,108	6,628	95,582	3,471	20,592	20,404	1,142	525	4,868	9,045	..	..	..	3,807,084
18,192	133,798	56,451	7,310	86,985	3,934	24,581	17,154	613	290	9,107	16,390	..	..	..	3,853,566
19,659	166,477	52,390	4,599	111,936	4,432	29,185	20,285	712	780	10,144	19,234	..	..	..	4,352,168
16,709	85,766	36,125	6,261	100,878	4,054	41,624		495	433	7,427 *1,295*	17,155 *221*	..	..	..	3,850,544 *1,516*
15,451	144,927	49,577	5,498	104,762	3,753	42,431		348	414	8,067 *1,333*	14,858 *164*	..	..	..	5,188,265 *1,497*
19,904	149,719	54,474	8,689	106,996	4,376	47,063		327	396	11,846 *1,167*	18,475 *160*	..	..	..	5,336,684 *1,327*
20,365	162,510	59,252	7,396	109,381	4,988	50,466		494	504	11,909 *1,311*	20,421 *151*	..	..	..	5,238,278 *1,462*

denote free irrigation.

No. 4—*Statement showing areas by classes of crops irrigated during the twelve years* (1928-29 *to* 1939-40)

	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40
	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Annual—												
Sugarcane ..	274,901	414,616	498,395	513,772	604,197	459,161	492,568	724,499	805,660 *147*	696,378 *71*	540,983 *62*	723,312 *84*
Kharif—												
Rice ..	307,273	366,989	366,826	250,734	282,173	316,040	261,169	336,791	298,035 *123*	403,468 *182*	451,684 *173*	413,791 *181*
Maize ..	181,553	169,261	169,696	138,698	111,946	99,837	48,130	81,007	76,135	167,612	170,515	202,382
Millet ..	223,835	157,860	80,006	43,717	87,728	65,519	19,224	55,468	37,073 *4*	76,331 *6*	64,456	72,004
Indigo ..	3,919	2,950	1,979	1,791	603	850	556	1,138	1,046	1,439	1,283	423
Cotton ..	368,227	433,981	432,543	386,927	240,900	387,816	223,128	281,225	291,434	320,508	359,802	298,987
Other crops ..	238,484	254,629	263,368	209,862	222,991	366,987	199,149	247,801	248,847 *328*	249,314 *199*	305,956 *188*	325,302 *202*
Total, *Kharif*..	1,323,291	1,385,670	1,314,418	1,031,729	946,341	1,231,049	751,356	1,053,425	952,570 *602*	1,218,672 *387*	1,353,696 *361*	1,312,889 *383*
Rabi—												
Wheat ..	1,056,639	1,162,446	933,714	984,436	1,069,460	1,026,553	1,084,804	1,069,818	882,535 *397*	1,547,261 *85*	1,619,397 *466*	1,505,821 *627*
Barley ..	162,853	221,606	153,597	124,497	156,672	132,921	176,175	148,795	113,740	158,573	180,612	158,420
Gram ..	157,728	122,845	113,291	74,701	154,460	77,308	187,968	180,810	120,059 *105*	246,581 *75*	212,859 *76*	203,093 *93*
Peas ..	207,380	271,388	263,350	154,998	176,480	157,788	211,148	255,016	238,493 *13*	244,900 *22*	228,306 *6*	236,948 *16*
Other food-grains.	747,126	752,160	574,369	504,767	639,935	632,934	743,975	606,124	531,140 *355*	834,857 *816*	796,005 *332*	776,441 *170*
Poppy ..	2,444	1,609	1,928	2,432	1,338	1,000	496	330	315	445	615	576
Other crops ..	190,203	199,511	149,192	108,611	212,714	88,370	205,076	313,346	206,032 *44*	240,598 *41*	404,211 *24*	320,773 *89*
Total, *Rabi* ..	2,524,373	2,731,505	2,189,441	1,954,442	2,411,059	2,116,874	2,609,642	2,574,239	2,092,314 *914*	3,273,215 *1,039*	3,442,005 *904*	3,202,072 *995*
GRAND TOTAL..	4,122,565	4,531,791	4,002,254	3,499,943	3,961,597	3,807,084	3,853,566	4,352,163	3,850,544 *1,516*	5,188,265 *1,497*	5,336,684 *1,327*	5,238,273 *1,462*

Figures in italics denote free irrigation.

Review of the *pro forma* Accounts of the Ganges Canal Hydro-Electric Scheme for the year 1939-40

A—Hydel Scheme

1. The *pro forma* accounts show the financial results of the scheme after taking into account the revenue realized or realizable, as also the entire liabilities paid or payable in respect of the year 1939-40, while the public accounts show only actual realizations and disbursements made during the year. The figures shown in the *pro forma* accounts, therefore, do not agree with those in the general Finance Accounts.

2. *Financial results*—The following statement compares the financial results of the scheme for the last three years ended 1939-40:

Particulars	1939–40	1938–39	1937–38
1	2	3	4
	(In thousands of rupees)		
(1) Capital outlay to end of the year (direct and indirect)	(*a*)3,60,64	3, 52, 05	3, 42, 49
(2) Accumulated arrears of simple interest ...	...	...	1, 99
(3) Total ...	3,60,64	3, 52, 05	3, 44, 48
(4) Gross revenue (including unrealized assessments)	38, 04	42, 61	28, 78
(5) Working expenses (direct and indirect and including liabilities)	9,87	5, 59	5, 97
(6) Depreciation	7,98	5, 71	4, 46
(7) Net revenue	20, 19	27, 31	18, 35
(8) Interest on capital outlay	13, 74	13, 41	12, 47
(9) Net profit	+6, 45	+13, 90	+5, 88
(10) Percentage of 7 to 1	5·6	7·8	5·3
(11) Ditto 7 to 3	5·6	7·8	5·3
(12) Ditto 7 to 4	53·1	64·1	63·7

(*a*) Excludes a sum of Rs.90,418 transferred from Hydel to other projects on account of cost of operating staff incurred during previous year.

3. The project estimate for Rs.3,42,88 lakhs was declared closed on 31st March, 1939, but the completion report is still under preparation. The capital outlay during 1939-40 amounted to Rs.9·50 lakhs and the progressive outlay to end of the year 1939-40 was Rs.3,60,64 lakhs.

4. *Revenue—(i) Receipts—(a)* The gross revenue from all sources during the year shows a decrease of Rs.4·57 lakhs as compared with the

previous year. Of the decrease Rs.1·77 lakhs are due to the reduction in the charge for energy supplied to State tube-wells from 9 to 8 pies per unit and the balance to reasons mentioned in sub-paragraph (*c*) *infra*. The decrease of net revenue is correlated to the rise in respect of depreciation charges and working expenses [*vide* sub-paragraph (ii) (*a*) and (iii) *infra*].

(*b*) The total revenue from the sale of electrical energy during the year under review has gone down to Rs.37·27 lakhs from Rs.42·27 lakhs in the previous year.

(*c*) The following table indicates the items in which decreases took place :

Items	1939–40	1938–39	1937–38
1	2	3	4
	(In thousands of rupees)		
(1) Municipalities	2, 73	2, 75	2, 21
(2) State railways	2, 41	2, 58	2, 35
(3) Pumping stations	98	1, 55	1, 44
(4) Conversion scheme	87	1, 21	77
(5) State tube-wells	15, 62	17, 19	10, 12
(6) Unrealized assessments	—97	2, 77	1, 01

It will be seen that there has been an abnormal decrease of the revenue earned from the pumping stations, conversion scheme and State tube-wells due to the reduction in rates for the supply to the State tube-wells and Ramganga pumping scheme, reduction in load and consequent fixed charges in the case of the latter and also to less pumping.

(*d*) The following table will indicate the items in which increases of revenue took place :

Items	1939–40	1938–39	1937–38
1	2	3	4
	(In thousands of rupees)		
(1) Distributing companies	8, 99	8, 74	7, 24
(2) Cantonments	1, 74	1, 71	1, 57
(3) Other Government departments ...	14	12	13
(4) Private consumers	69	62	49
(5) Rural consumers	3, 88	2, 95	1, 93
(6) Departmental consumers	18	8	7

It will be seen that the consumption of electrical energy by the distributing companies, private consumers and rural consumers is maintaining its progress.

(*e*) *Unrealized assessments*—The unrealized dues of the year amounted to Rs.8·13 lakhs out of which Rs.1·14 lakhs represent assessment for March, 1940, having been made as usual in April, 1940. The balance of Rs.6·99 lakhs represents dues outstanding against various consumers noted below :

	(In thousands of rupees)
(1) Distributing companies	5,63
(2) Municipalities	28
(3) State railways	—14
(4) Cantonments	2
(5) Other Government departments	—1
(6 Private consumers	15
(7) Irrigation pumping	5
(8) Conversion scheme	2
(9) State tube-wells	81
(10) Rural consumers	17
(11) Departmental consumers	1
Total ...	6,99

Out of the dues of Rs.5·63 lakhs outstanding from the distributing companies, Rs.5·03 lakhs represent dues against a company working under the management of an official liquidator. Of this amount, a sum of Rs.1,03,913 has been written off as irrecoverable by Government, as, the award made by the arbitrator which was made absolute by the Honourable High Court, left out this amount. The amount written off will be adjusted in 1940-41.

NOTE—The minus balances in the items 3 and 5 above denote recoveries without assessment.

(*ii*) *Working expenses*—(*a*) The following table compares the direct charges incurred in generating electric energy during 1939-40 and the previous two years :

Expenditure under	1939–40		1938–39		1937–38	
	Expenditure	Percentage to the total charges	Expenditure	Percentage to the total charges	Expenditure	Percentage to the total charges
1	2	3	4	5	6	7
	Rs.		Rs.		Rs.	
A—Power generation ...	1,37,036	14·1	1,27,605	13·4	46,909	8·0
B—Transmission ...	58,379	6·0	35,689	3·7	28,354	4·8
C—Transformation ...	63,131	6·5	46,155	4·8	60,584	10·4
D—Distribution ...	13,514	1·4	8,096	0·8	11,081	1·9
Total ...	2,72,060	28·0	2,17,545	22·7	1,46,928	25·5
E—General management	6,97,883	72·0	7,38,177	77·3	4,33,436	74·5
Total direct working expenses excluding depreciation charges.	9,69,943	...	9,55,722	..	5,80,364	...

(*b*) The operating ratio, i.e., the ratio between the working expenses (including depreciation but excluding interest charges) and gross revenue as assessed, was as follows for the last three years :

	1939–40	1938–39	1937–38
	(In thousands of rupees)		
Working expenses	17, 85	15, 30	10, 43
Gross revenue (including unrealized assessments)	38, 04	42, 61	28, 55
Operating ratio (per cent.)	46·9	35·9	36·5

The increase in the operating ratio is mainly due to the increase in depreciation charges, *vide* sub-paragraph (iii) below and decrease in gross revenue.

(*iii*) *Depreciation charges*—The depreciation charges adjusted during the year amounted to Rs.7·98 lakhs against Rs.5·71 lakhs last year. The increase under this head is correlated to the capital outlay in respect of which depreciation is chargeable.

5. ***Depreciation Reserve Fund***—(*a*) No change occurred in the method of calculating depreciation during the year.

It has been decided that depreciation should be provided for buildings and a rate of one per cent. representing an estimated life of 100 years has been adopted but the date of effect has not been fixed.

The Auditor General has sanctioned the transfer of the " Depreciation Reserve Fund " from the category of " Deposits not bearing interest " to that of the head " Deposits bearing interest " and Government have decided that interest should be allowed from the year 1940-41 at the same rate as is charged in respect of the Hydel Capital outlay.

(*b*) *Short credits to the fund*—(i) A credit to the Fund of Rs.8,03,714 representing depreciation for the two years 1934-35 and 1935-36, is in arrears. Government proposed last year to consider the question when dealing with the budget for 1940-41. Owing to the unsatisfactory condition of the provincial finances, however, they have decided to postpone the matter for another year.

(ii) A credit to the Fund of Rs.1,64,628 (less the amount already credited to the Fund, if any) on account of the estimated original value of the *Sal ballas* replaced to end of 1939-40 by the steel poles has not been afforded to the Fund as required under rule 1(b) of the Depreciation Fund Rules. The number of instalments in which the payment of this arrear contribution will be made is, however, under consideration of the Government.

6. *Progress of electrification—Energy cost statement*—(i) The following figures compare the energy generated and sold during the three years ended 1939-40 :

Items	1939-40	1938-39	1937-38
1	2	3	4
	(In thousands of units)		
(1) Total energy generated	9,15,35	9,22,64	6,36,99
(2) Loss in transmission and transformation ...	1,92,36	1,72,25	1,20,40
(3) Net energy available for disposal ..	7,22,99	7,50,39	5,16,59
(4) Total energy sold and paid for ...	7,14,24	7,39,10	4,93,64
(5) Energy allowed free and unassessed ...	8,75	11,29	22,95
(6) Percentage of energy lost to energy generated.	21·0	18·7	18·9

The amounts of energy generated and sold, as compared with the last year, show a decrease. The percentage of loss of energy has increased this year from 18·7 to 21·0 and is also much above the figure of 15 forecasted in the project estimate.

The generating capacity of the Hydel plants is 19,20,63 lakhs units, against which only 9,15,35 lakhs units were generated during the year under review.

(ii) The following statement compares the free su ly of energy during the three years ended 1939-40 :

Items	1939-40	1938-39	1937-38
1	2	3	4
	(In thousands of units)		
(1) Pilot lights and sub-stations ...	92	96	89
(2) Menial staff quarters	60	43	35
(3) Power house including pumping stations...	7,00	7,28	5,35
(4) Other schemes	23	2,62	16,36
Total ...	8,75	11,29	22,95

It will be seen that the consumption of free units has decreased substantially except in the case of " Menial Staff Quarters ." The decrease specially in the case of " Other Schemes " is due to the fact that all independent schemes are now charged for the energy supplied.

7. The following are the comparative figures of the cost of production and the average rate at which energy has been sold during the last three years :

Particulars	1939-40	1938-39	1937-38
	(Rate per unit in annas)		
(1) Cost of production	0·55	0·62	0·74
(2) Average sale price	0·83	0·86	0.93
(3) Net return per unit sold	0·28	0·24	0·19

The average cost of production has been calculated on the net energy available for disposal (i.e., after excluding the losses and the free units).

B—Other Schemes

8. Closely connected with the Hydro-electric scheme are two other Irrigation schemes, viz. the Ramganga and State tube-well schemes, which though financially independent of the Hydel scheme with their own Capital and Revenue accounts are closely connected with the Hydel scheme, inasmuch as they utilize Hydel power. Their financial results shown in the Administrative Accounts for 1939-40 are as follows :

Heads	Ramganga scheme	State tube-wells
	(In thousands of rupees)	
(1) Capital outlay to end of the year (direct and indirect).	25,54	1,43,83
(2) Accumulated arrears of simple interest.	21,63	19,24
(3) Total, Capital invested ...	47,17	1,63,07
(4) Gross revenue	1,52	38,10
(5) Working expenses (direct and indirect).	1,25	27,95*
(6) Net revenue	27	10,15
(7) Interest during the year ...	1,22	4,57
(8) Net loss (—) or profit (+) ...	– 95	+5,58
(9) Percentage of net revenue to capital (6 to 3).	0·57	6·22
(10) Percentage of net loss or gain to capital (8 to 3).	–2·01	3·42

* Includes 1,42 on account of depreciation.

The net result of the three schemes combined during the last three years shows a profit of Rs.3.91 lakhs as shown below :

Particulars	1939-40	1938-39	1937-38
1	2	3	4
	(In thousands of rupees)		
Ramganga scheme—loss (–)	– 95	–1,92	–1,93
State tube-well scheme—loss (—) or gain (+)	+5,58	–11,80	–8,77
Hydro-electric scheme—gain (+)	+7,55	+11,13	+5,02
Net loss (–) or gain (+) on the three schemes as a whole.	+12,18	–2,59	–5,68

The improvement is mainly due to the increase of revenue on the State tube-well scheme.

9. The *pro forma* accounts are checked in the Audit Office only in respect of total figures, as the details recorded therein are not available in the Audit Office.

S. P. VARMA,
Accountant General,
United Provinces.

GANGES CANAL HYDRO-ELECTRIC SCHEME

Pro forma ACCOUNTS FOR THE YEAR ENDING MARCH 31, 1940

I—General Abstract of the financial results

Capital position				Revenue position							
Capital outlay to the end of the year		Accumulated arrears of simple interest to the end of the year	Total of columns 1 to 3	Gross revenue for the year including unrealized assessment	Working expenses direct and indirect and liabilities	Charges against revenue on account of depreciation	Total of columns 6 and 7	Net revenue, column 5 minus column 8	Simple interest for the year	Net profit column 9 minus column 10	Percentage of net revenue columns 9 to 4
Direct charges	Indirect charges										
1	2	3	4	5	6	7	8	9	10	11	12
Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	Rs.	
3,58,20,487	2,43,645	...	3,60,64,132	38,03,601	9,86,533	7,98,341	17,84,874	20,18,727	13,73,875	6,44,852	5·60

Certified that the figures except those relating to "Add and deduct liabilities" appearing in the Revenue account of the above *pro forma* accounts have been checked as far as possible and found correct, subject to the remarks contained in my review on the *pro forma* accounts.

S. P. VARMA,
Accountant General·

GANGES CANAL HYDRO-ELECTRIC SCHEME

Pro forma ACCOUNTS FOR THE YEAR ENDING MARCH 31, 1940

(II Revenue Accounts)

Debit

Item number	Particulars	Amount Rs.	a.	p.	Grand total of each item Rs.	a.	p.
1.	*A—Power generation—*						
	(1) Coal charges	59,829	5	9			
	(2) Fuel oil	4,348	1	9			
	(3) Oil, waste and stores	7,700	8	9			
	(4) Operating staff charged to works ...	2,914	9	0			
	(5) *Maintenance and repairs—*						
	(*a*) Buildings ...	24,566	2	0			
	(*b*) Plant and machinery ...	36,735	9	1			
	(6) Extensions and improvements ...	941	6	0			
					1,37,035	10	4
2.	*B—Transmission—*						
	(1) Stores	7,939	12	6			
	(2) Operating staff charged to works ...	3,347	0	0			
	(3) Maintenance and repairs—						
	(*a*) Buildings	10,131	4	0			
	(*b*) Plant and machinery ...	36,892	0	5			
	(4) Extensions and improvements ...	68	10	0			
					58,378	10	11
3.	*C—Transformation*						
	(1) Oil, waste and stores	3,952	15	3			
	(2) Operating staff charged to works ...	5,326	9	0			
	(3) Maintenance and repairs—						
	(*a*) Buildings	12,867	4	9			
	(*b*) Plant and machinery ...	38,051	2	9			
	(4) Extensions and improvements ...	2,933	0	3			
					63,131	0	0
4.	*D—Distribution*						
	Operating charges in rural areas—						
	(*a*) Maintenance and repairs ...	13,390	5	9			
	(*b*) Extensions and improvements	124	0	0			
					13,514	5	9

Credit

Particulars	Amount Rs.	a.	p.	Grand total of each item Rs.	a.	p.
1. *Sale of electricity*						
(*a*) Distributing companies ...	8,99,214	0	6			
(*b*) Municipalities	2,73,518	7	3			
(*c*) State railways	2,40,544	12	0			
(*d*) Cantonments ...	1,73,934	9	0			
(*e*) Other Government departments	14,286	6	0			
(*f*) Private consumers	69,313	6	0			
(*g*) Pumping stations	98,262	14	6			
(*h*) Conversion schemes ...	87,235	13	8			
(*i*) State tube-wells	15,61,642	14	0			
(*j*) Rural consumers	3,88,148	8	11			
(*k*) Departmental consumers ...	18,210	6	2			
				38,24,312	2	0
(*l*) Rent of meters and other apparatus	583	3	0			
(*a*) Surcharge	41	15	6			
(*b*) Miscellaneous	76,060	2	5	76,685	4	11
Total direct receipts ...	...			39,00,997	6	11
Add:						
Unrealized assessments outstanding *at the end of the year—*						
(i) Unrealized balance at the end of March, 1940	6,98,835	13	11			
(ii) Assessment for March, 1940, made during April, 1940 ..	1,13,718	6	1			
	8,12,554	4	0			
Deduct:						
Unrealized assessment outstanding *at the beginning of the year—*						
(i) Unrealized balance at the end of March, 1939 ..	6,69,735	9	7			
(ii) Assessment for March, 1939 made during April, 1939...	2,40,215	7	4			
	9,09,951	0	11	−97,396	12	11
Total gross revenue ...				38,03,600	10	0

	Rs.	a.	p.	Rs.	a.	p.
5. *E—General management and expenses—*						
(1) Publicity and demonstration ...	...					
(2) Telephone charges	72,967	3	0			
(3) Compensation	650	0	0			
(4) Losses on stock	98	14	0			
(5) Establishment	5,48,345	0	0			
(6) Tools and plant	21,980	0	0			
(7) Leave and pensionary charges ...	53,864	0	0			
(8) Provident Fund contribution ...	..					
(9) Renewal and replacements .	1,43,958	0	0			
(10) Deduct amount met from depreciation reserve fund ...	1,43,958	0	0	6,97,883	1	0
6. *F—Indirect charges*						
1. Audit and accounts charges ...	3,458	0	0	3,458	0	0
7. *G—Depreciation*						
Depreciation as per depreciation account.	7,98,341	3	9	7,98,341	3	9
Total working expenses ...	...			17,71,741	15	9
Add—(1) Liabilities of the year not paid during the year 1939-40.	15,309	15	3			
(2) Royalties for 1939-40 payable to Messrs. Martin & Co. not paid during the year.	15,979	5	0			
Deduct—Excess liabilities shown in 1938-39.	101	2	0	...		
	31,188	2	3			
Deduct—(i) Liabilities of the previous year paid during the year.	6,894	10	7			
(ii) Royalties for 1938-39 paid during the year.	11,161	14	0			
	18,056	8	7	13,131	9	8
Grand total of working expenses ...	...			17,84,873	9	5
Balance being excess of revenue over working expenses.	.			20,18,727	0	7
GRAND TOTAL ...	...			38,03,600	10	0

GRAND TOTAL 38,03,600 10 0

E. C. B. WALTON,
Hydro-Electric Engineer,
Ganges Canal, Roorkee.

GANGES CANAL, HYDRO-ELECTRIC SCHEME

III—Depreciation Reserve Fund Account for the year 1939-40

Debit	Rs.	*Credit*	Rs.
To amount withdrawn during the year	1,43,958	By balance at the beginning of the year	13,93,865*
To balance at the end of the year carried down .	20,48,248*	By amount credited during the year	7,98,341
Total ...	21,92,206	Total ...	21,92,206
		By balance brought down ...	20,48,248*

* Excludes Rs.8,03,714 included in the last year's closing balance. The amount represents depreciation charges prior to 1936-37 which has not yet been credited to the Fund.

GANGES CANAL, HYDRO-ELECTRIC SCHEME

IV—Energy cost statement for the year 1939-40

(1) Total number of units generated during the year ...		91,534,787
(2) Total number of units sold during the year including energy consumed in canal inspection houses		71,423,639
(3) Total number of units unaccounted for (gross)		20,111,148
Deduct :		
(*a*) Units allowed free, *vide* details below :		
(i) Energy consumed by pilot lights and substations	92,569	
(ii) Power houses	699,672	
(iii) Menial staff quarters	59,694	851,935
(*b*) Units consumed by other schemes not assessed		22,869
Total ...		874,804
(3A) Net units lost in transmission, transformation and distribution		19,236,344
(4) Percentage of units lost to units generated		21·01
(5) Total expenditure during the year :		Rs.
(i) Working expenses and maintenance charges including indirect and depreciation charges		17,84,874
(ii) Interest charges for the year		13,73,875
Total cost of generation, transmission, transformation and distribution		31,58,749
(6) Cost per unit generated		0·55 annas.
(7) Total revenue for energy sold during the year—	Rs.	Rs.
(i) Gross revenue	38,03,601	
(ii) *Deduct*—Miscellaneous revenue and other fortuitous receipts not connected with the sale of energy	76,833	37,26,768
Average price per unit sold		0·83 annas
Net profit per unit		0·28 ,,

E. C. B. WALTON,
Hydro-Electric Engineer,
Ganges Canal, Roorkee.

UNITED PROVINCES.

Administrative Accounts of the Irrigation Works of the United Provinces for the year 1939-40.

REVIEW.

[NOTE.—Figures not having the word rupees before them are in thousands.]

The annual review on the Administrative Accounts contains information in regard to the following items as required by para. 14 of Appendix 3 of the Account Code Volume IV.

(*i*) Capital invested in Works.

(*ii*) Working expenses for their maintenance and upkeep.

(*iii*) Revenue realized from them.

Thus it gives concisely a general idea of the annual working of the canals and Hydel Schemes, etc., in these provinces and furnishes material for determining whether any particular work should be classed as "Productive" or "Unproductive", that is to say, whether the net revenue derived from it is or is not sufficient to cover the annual interest charges on the Capital invested.

SECTION I.—CAPITAL ACCOUNT.

2. The total capital outlay (direct and indirect) incurred during the year 1939-40 was Rs. 20,29,763 for Productive and Rs. 1,20,368 for Unproductive works against Rs. 21,17,195 and Rs. 41,690 respectively, during the preceding year. The aggregate capital outlay during the year under review has thus been practically the same as in the year 1938-39. The table below however shows a comparison of expenditure for the two years against some of the projects of interest.

	Expenditure during 1939-40.	Expenditure during 1938-39.
Productive -	Rs.	Rs.
Sarda Canal	5,38,976	—7,429
Tube Wells—State . .	5,86,250	6,23,918
Hydro-Electric Grid Scheme .	9,49,782	9,55,530
Fyzabad Electricity and Gogra Pumping Scheme.	1,30,190	4,70,448
Daurala Sugarcane Tramway . .	—2,98,939	—18,063

The expenditure against Sarda Canal includes an expenditure of Rs. 3,75,342 (including departmental and indirect charges) incurred on the Sarda Extension Scheme and that against the Daurala Sugarcane Tramway, the sale proceeds of the main line of the Tramway, and the Mawona Mandi and the farm siding, amounting to Rs. 2,65,000.

No new projects have been added to the list of Works during the year under report.

The outlay on Sarda Canal is inclusive of the following contribution from Revenue so as to wipe off the unproductive capital outlay on water courses as explained below :—

	During 1939-40.	Up to date.
	Rs.	Rs.
Sarda Canal	50,000	20,00,000

Water courses of Sarda Canal—With a view to relieve the capital accounts of the Sarda Canal of the unproductive capital outlay on its water courses which has been borne by Government instead of being recovered from the cultivators concerned, it has been decided to transfer a portion of the revenue derived from water rates of this canal to the repayment of the said capital outlay in suitable yearly instalments commencing from 1930-31. The amounts so written off the capital accounts are exhibited under a separate head, " *Deduct*—Contributions from Revenue to wipe off the unproductive capital expenditure on water courses " in the capital account (Part II) of the canal.

SECTION II.—REVENUE ACCOUNT.

3. The gross revenue and the working expenses against revenue for the past two years in respect of the canals in operation are tabulated below :—

Class.	1938-39.			1939-40.			Increase + and Decrease—in 1939-40.	
	Gross Revenue, Direct and Indirect.	Working Expenses, Direct and Indirect.	Percentage.	Gross Revenue, Direct and Indirect.	Working Expenses, Direct and Indirect.	Percentage.	Revenue.	Working Expenses.
	Rs.	Rs.	%	Rs.	Rs.	%	Rs.	Rs.
Productive .	2,73,79,504	1,08,34,664	39·67	2,98,53,714	1,12,15,533	37·62	24,74,210	3,80,869
Unproductive .	20,44,154	9,62,266	47·11	17,92,536	9,00,934	50·40	—2,51,618	—61,332
TOTAL .	2,94,23,658	1,17,96,930	40·19	3,16,46,250	1,21,16,467	38·31	22,22,592	3,19,537
							19,03,055	

The gross revenue rose by 24,33 under productive and fell by 2,44 under Unproductive canals, while the working expenses rose by 3,40 under Productive and fell by 54 under Unproductive canals. The net revenue therefore, was more than that in the previous year by 20,93 under Productive and loss by 1,90 under Unproductive canals. The year under review thus recorded a net increase of 19,03 as compared with the previous year. The increases occurred chiefly under Ganges Canal 8,95 Eastern Jumna Canal 1,76 Sarda Canal 1,05 State Tube Wells 17,66 Betwa Canal 58 which were partly counterbalanced by fall of revenue under lower Ganges Canal 7,78 Hydero Electric Grid. 3,24 Rohilkhand Canal 4,03.

NOTE.—Taking into consideration the fact that 4,38 were erroneously accounted for under Rohilkhand Canals instead of under Sarda Canal in the year 1938-39, the former record an increase of 31 and the latter a decrease of 334.

4. (*a*) There was an increase in the working expenses of the following without a commensurate increase in receipts :—

(After deducting "Recoveries of Expenditure".)

		Working Expenses.	Gross Receipts.
		Rs.	Rs.
Sarda Canal	1938-39.	18,12,522	39,22,847
		Erroneously accounted for under Rohilkhand Canal.	4,38,000
			43,60,847
	1939-40	19,82,251	41,96,460
		+1,69,729	—1,64,387
Hydro Electric Grid	1938-39	15,25,813	39,80,147
	1939-40	17,66,373	38,95,629
		2,40,560	—84,518

4. (*b*) Cases in which "Receipts" showed a marked decline :—

Nil.

5. The net result of working of all the canals including the Hydro-Electric systems in the Province for the past five years after meeting the working expenses and the interest charges on the capital invested is shown in the following table :—

Year.	Productive.	Unproductive.	Net.
1935-36 . . .	56,67	—5,43	51,24
1936-37 . . .	50,58	—6,13	44,45
1937-38 . . .	39,83	—9,35	30,48
1938-39 . . .	66,43	—1,90	64,53
1939-40 . . .	86,65	—3,83	82,82

Section III.—Classification of Works between Productive and Unproductive.

6. The Sarda Canal, the construction estimate of which was closed on 30th March 1940, has failed to achieve successful result during the last ten years and it does not appear at all likely that the yield will increase in the near future to anything like the extent that would be necessary to compensate the loss sustained by the project so far. It is therefore suggested that the classification of the Canal might be changed from Productive to Unproductive. The financial results of other canals do not indicate the necessity of a change in the classification.

7. In respect of the canals the capital accounts of which were debited with the cost of restoration of flood damages, the comparative percentages for the year 1939-40 of revenue on the capital invested including and excluding the cost of restoration of flood damages, are given below for incorporation in the local Government's Administration report :—

Canals.	Percentage return on the capital invested inclusive of the cost of restoration of flood damages.	Percentage return on the capital invested excluding the cost of restoration.
Ganges Canal	14·61	15·30
Lower Ganges Canal	7·97	7·98
Eastern Jumna Canal	36·43	40 39
Bijnor Canals	10·66	11·32
Dun Canals	4·25	5·87
Rohilkhand Canals	3·89	4·00

S. P. VARMA,
Accountant General,
United Provinces.

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